

ILLINOIS NATURE PRESERVES COMMISSION

AGENDA -- FORTY-NINTH MEETING

Illinois Beach State Park Lodge

Zion, Illinois

7:30 p.m., October 2, 1973

8:30 a.m., October 3, 1973

* Refer to accompanying documentary material

Documentary material previously distributed

1) Call to order and roll call:

Possible attendants:

Dr. William J. Beecher

Gaylord Donnelley

Dr. Leonard Durham

Roland Eisenbeis

Roger Findley

Dr. Willard D. Klimstra

Mrs. C. Phillip Miller

Dr. Charles Olmsted

Dr. John Warnock

Anthony T. Dean

Dr. George Sprugel

Dr. Alfred Koelling

Daniel Pike

Dr. Margery C. Carlson

Gunnar Peterson

Dr. Robert Betz

John Schwegman

George B. Fell

Max Hutchison

Gerald Paulson

John White

Mike Madany

~~Robert~~ Standish

Kate Staley

Barbara G. Fell

John Taggart

2) Adoption of agenda

3) Approval of 48th meeting minutes

4) Financial report

* Expense statement for 1973 Fiscal Year, July 1, 1972 - June 30, 1973

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AGENDA -- PORTLAND MEETING

Illinois Beach State Park Study

June 1970

7:30 a.m. - 9:00 a.m.

9:30 a.m. - 11:00 a.m.

1. Presentation of preliminary report

2. Discussion of preliminary report

10. Presentation of preliminary report

The following persons:

Dr. William L. Hamilton

Dr. Robert L. Smith

Dr. Robert L. Smith

Dr. Robert L. Smith

Dr. Robert L. Smith

Dr. Robert L. Smith

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Dr. Robert L. Smith

- * 5) Reports of officers & staff
- 6) Reports of Conservation Director & staff
- 7) Next meeting arrangements
- 8) Election of officers
- 9) Dedication of nature preserves within public hunting areas (such as Iroquois County Conservation Area)
- 10) Cemetery prairies
Report by Dr. Betz
- 11) Preservation of Caves in Illinois
 - * Report by John White
- 12) Yellowwood -- A rare tree in Illinois
 - * Report by Max Hutchison & John White -- Recommend preservation by Forest Service

AREAS

- 13) Adams County -- Burton Cave (78 acres)
 - * Report by John White -- Recommend dedication

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14) Clinton County -- Lost Creek Marsh (approx. 350 acres)

- * Report by John White

15) Cook County -- Busse Woods Nature Preserve (Salt Creek impoundment)

- # Letter from Dr. Klimstra to Art Janura, 8/6/73
- # Letter from Art Janura to Dr. Klimstra, 8/13/73

Status report by Mr. Fell

Review & determination of Commission's position

16) Grundy County -- Goose Lake Prairie Nature Preserve

- * Trail construction specifications

17) Johnson County -- Heron Pond & Wildcat Bluff Nature Preserve

- * Drainage

Addition to Nature Preserve -- Little Black Slough, acquisition progress report

18) LaSalle County -- Starved Rock Nature Preserve

Archery range problem

Report by John Schwegman

19) Lawrence County -- Robeson Hill Nature Preserve addition (90.5 acres)

- * Preliminary approval of dedication (dedication recommended 46-21, R 284)

(14) Chick County -- Lost Creek Mound (1911) (1911)

Report by John White

(15) Chick County -- Swasey Woods Mound (Preston) (1911) (1911)

Let - Mrs. Dr. King, 1911, 1912, 1913
Let - Mrs. Dr. King, 1911, 1912, 1913

Notes by Mrs. King

Review & description of the mound

(16) Chick County -- Swasey Woods Mound (Preston) (1911) (1911)

Notes by Mrs. King

(17) Chick County -- Swasey Woods Mound (Preston) (1911) (1911)

Notes by Mrs. King

Notes by Mrs. King

(18) Chick County -- Swasey Woods Mound (Preston) (1911) (1911)

Notes by Mrs. King

Notes by Mrs. King

(19) Chick County -- Swasey Woods Mound (Preston) (1911) (1911)

Notes by Mrs. King

20) Lee County -- Bartlett Woods

Possible presence of oak wilt -- Report by Gerald Paulson

21) Monroe County -- Fogelpole Cave

* Report by John White

22) Perry County -- Behre Bluff (approx. 50 acres)

* Report by John White

23) Pike County -- Twin Culverts Cave (5 acres)

* Report by John White (approved in principle 37-14, R184)

24) Wabash County -- Beall Woods Nature Preserve

Progress report by John Schwegman on coal mining and oil spill

25) Warren County -- Massassaga Prairie (approx. 92.1 acres)

* Report by John White

26) Other areas

27) Other business

28) Adjournment

30) Lee County -- Battle Woods

Possible purchase of land within Report by Gerald Paulson

See also page 10 of report dated 10/10/63

31) Monroe County -- Fossiliferous Cave

* Report by Lawrence H. Hootch, Jr.

10/10/63

32) Barry County -- Barry Bluff (approx. 50 acres)

* Report by Lawrence Hootch, Jr.

10/10/63

33) Pike County -- Twin Caverns Cave (15 acres)

* Report by Lawrence Hootch, Jr. (dated 10/10/63)

See also page 10 of report dated 10/10/63

34) Webster County -- Bush Woods Nature Preserve

Progress report by John Schaefer, Jr. dated 10/10/63

See also page 10 of report dated 10/10/63

35) Warren County -- Hartsburg Bluffs (approx. 25.1 acres)

* Report by John Hartsburg, Jr. (dated 10/10/63)

36) Other areas

See also page 10 of report dated 10/10/63

37) Other business

See also page 10 of report dated 10/10/63

38) Miscellaneous

See also page 10 of report dated 10/10/63

ILLINOIS NATURE PRESERVES COMMISSION
MINUTES OF FORTY-EIGHTH MEETING
July 10, 11, 1973

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ILLINOIS NATURE PRESERVES COMMISSION

MINUTES OF FORTY-EIGHTH MEETING

Forest Park Nature Center
Peoria Heights, Illinois
8:00 p.m. July 10, 1973 &
8:45 a.m. July 11, 1973

48-1) Call to order:

The meeting convened at 8:00 p.m. pursuant to the call of Chairman Klimstra.

Members present: Dr. William J. Beecher, Gaylord Donnelley, Roland Eisenbeis, Dr. Willard D. Klimstra, Dr. Leonard Durham, Dr. Charles Olmsted and Dr. John Warnock.

Members absent: Roger W. Findley and Mrs. C. Phillip Miller.

Others present: Mr. Anthony T. Dean, Director, Department of Conservation, Advisor; Dr. George Sprugel, Jr., Chief, Illinois Natural History Survey, Advisor; Dr. Robert Evers, Illinois Natural History Survey, Consultant; Dr. Alfred C. Koelling, Illinois State Museum; George B. Fell, Executive Secretary, Max Hutchison and John White, Field Representatives, and Donald McFall, Field Assistant, Illinois Nature Preserves Commission; John Schwegman, Staff Specialist and John Garton and Marlin Bowles, Natural Area Biologists, Natural Areas Section, Department of Conservation; Dr. Dale Birkenholz, Illinois State University; Dr. Peter Schramm, Knox College Biological Field Station; Dr. Glen Sanderson, Illinois Natural History Survey; Robert Standish, U.S. Fish & Wildlife Service, Lebanon, Ohio; Karl Bartel; Tom Edwards; Mrs. Barbara G. Fell; and Mrs. Charles E. Olmsted. Mr. Dean left during Item 21. Dr. Birkenholz, Dr. Schramm, and Mr. Edwards were present for the Wednesday session only. William L. Rutherford, Forest Park Foundation; Rhodell Owens, Superintendent of the Peoria Pleasure Drive and Park District; and Mrs. Owens were present at the beginning of the meeting to greet the Commission.

48-2) Adoption of agenda:

Mr. Fell suggested adding to the agenda the proposed Little Black Slough addition to Heron Pond Nature Preserve, Johnson County; effect of the proposed Salt Creek impoundment on Busse Forest Nature Preserve, Cook County; and the proposed highway rest area at Robeson Hills Nature Preserve, Lawrence County.

It was moved by Dr. Beecher, seconded by Dr. Durham, and carried that the agenda be adopted with the proposed additions and subject to change of sequence by the Chairman.

48-3) Minutes of 47th meeting:

It was moved by Dr. Durham, seconded by Dr. Beecher, and carried that the minutes of the 47th meeting, held at Giant City State Park on April 11, 1973, be approved as presented.

48-4) Financial report:

Mr. Fell reported that the expense statement for the period from July 1, 1972 through June 30, 1973 was still in preparation. Expenses had exceeded the initial budgetary allotment of \$58,500 but had been less than the \$61,247.07 that finally was available.

48-5) Reports of officers and staff:

Mr. Fell reported on the following matters:

Staff activities: Copies of reports of staff activities for April, May, and June were distributed.

Personnel: Gerald Paulson, Field Representative, was on a 5-week leave of absence to attend summer school. Donald McFall commenced work as a temporary office and field assistant on April 9. Michael Madany was working as a volunteer for the summer, inventorying natural areas in southern Cook County.

Special use permits: Six special use permits were granted since the last meeting; one was denied.

Natural Land Institute acquisitions: Land acquisition commitments in behalf of the State were as follows on June 30, 1973:

Project	No. of tracts	No. of Acres	Paid out prior to 3/31/73	Paid out since 3/31/73	Sold since 3/31/73	Total Commitment
Castle Rock	1	3.51	\$ 7,500		\$ 7,500	
Reavis Spring	1	49.00	6,818		6,818	
Easton Prairie	2	.94	3,220			\$ 3,220
Big Bend	1	97.64		\$35,000		35,000
			\$17,538	\$35,000	\$14,318	\$38,220

The Natural Land Institute had conveyed the Wilkins tract at Big Bend, LaSalle County, to the State on July 2, 1973.

Status of Commission-approved nature preserve dedications: Dedication of Bartlett Woods, Lee County (23 acres); Reavis Spring Hill Prairie, Mason County (49 acres); and Harlem Hills (Easton) Prairie, Winnebago County (52.59 acres), were awaiting approval of the Department and the Governor. Dedications of Baber Woods, Edgar County (59 acres), and Cedar Glen, Hancock County (182 acres), were awaiting approval of the owner (The Nature Conservancy), the Department, and Governor.

Commission publications and reports: Duplicating of 2,670 copies of the Commission's 1971-1972 biennial report had been completed on May 25 and copies had been distributed to the General Assembly, the Governor, the Department of Conservation and the Commission's mailing list. Additional copies were to be distributed.

Duplicating of 2,000 copies of "The Natural Divisions of Illinois", Part 2 of the Comprehensive Plan for the Illinois Nature Preserves System, was nearing completion.

The Commission's report on preservation values of the Middle Fork of the Vermilion River, Vermilion County, had been completed and submitted to Governor Walker on April 23, 1973. A letter critical of the report had been received from Ronald Pennock, Director of the Vermilion County Conservation District, and copies had been distributed to Commission members.

The report on the "Sag Valley Site", DuPage Township, Will County had been completed and distributed to the House of Representatives on May 16, 1973 pursuant to House Resolution 67.

Liaison with the U.S. Forest Service: Mr. Hutchison had prepared a report detailing his discussions with the U.S. Forest Service regarding cooperation between personnel of the Shawnee National Forest and the Commission staff.

Legislation: Mr. Fell noted that the Retention of Use Bill, SB 976 (Keegan) had not been approved by the Senate Agriculture, Conservation, and Ecology Committee, but was still alive; that the Cemetery Nature Preserve Dedication Bill, HB 1254 (Nardulli) was in the House Agriculture and Natural Resources Committee; that the Bounty Bill, SB 977 (Keegan), which repeals authority for counties to bounty foxes and crows, had passed the Senate and passed the 2nd reading in the House; and that the Scenic Rivers Bill, HB 481 (McDonald), and the Natural Rivers & Wetlands Bill, SB 578 (Berning) had been killed in committee and another Scenic Rivers Bill, HB 1530 (Palmer) was still alive.

Allerton Park-Oakley Reservoir, Piatt County: Pursuant to a letter from Col. Richard Wells of the Chicago District of the Corps of Engineers commenting on the Commission's letter to Governor Walker in opposition to the present plans for the Oakley Reservoir, Chairman Klimstra had written to the Governor clarifying certain points concerning Dr. Eldon Franz' studies on the potential impact of the reservoir on the ecology of Allerton Park.

Environmental Protection Agency burning regulations: Mr. Fell presented an exchange of correspondence with the Illinois Environmental Protection Agency concerning the burning of prairie.

Chestnut Oak in Illinois: Mr. White has spent considerable time determining the distribution and extent of the rare Chestnut Oak in Illinois, and is conferring with personnel of the Shawnee National Forest to insure the preservation of some stands of this species and other representative upland forest vegetation within the national forest. He had prepared a lengthy memorandum concerning discussions with the Forest Service regarding the chestnut oak and other dry forest types.

Illinois Beach State Park and Nature Preserve, Lake County: The Illinois State Geological Survey has published a report entitled "Sedimentology of a beach ridge complex in northeastern Illinois" which discusses the geological origin and character of the State park and nature preserve. The study relates directly to the present erosion problem along the Lake Michigan shore. It also provides an excellent basis for understanding the natural history of the nature preserve.

Mr. Schwegman reported that he had requested the Illinois Water Survey to provide information on the hydrology of Dead River within the State park and nature preserve but that nothing new had been disclosed.

48-6) Report of Conservation Director and Natural Areas Staff:

Director Dean reported on the following matters:

The Department of Conservation's budget for FY 74 had received further cuts. The Commission's budget remains at \$58,000.

The Department had received approval of an expanded Federal grant which will make possible the acquisition of the entire project area at Thorn Creek Woods, Will County. Acquisition should be completed within the present fiscal year.

The Will County Forest Preserve District has requested matching BOR funds for purchase of a 160-acre tract in the Des Plaines River valley near Lemont. This is part of the area included in the Commission's report on the "Sag Valley" to the House of Representatives.

The Department is actively engaged in finding a solution to the beach erosion problem at Illinois Beach State Park.

Acquisition of tracts at Chauncey Marsh, Lawrence and Crawford counties, is being hampered by opposition from landowners and legislators.

Mr. Schwegman reported that one tract had been acquired at Franklin Creek, Lee County, and two tracts have been optioned at Ayers Sand Prairie, Carroll County. Options have been obtained from 2 of the 5 interest holders of a tract at Chauncey Marsh, and condemnation proceedings were being initiated for tracts at Lusk Creek Canyon, Pope County, and Wilson Bog, Lake County. The Department is ready to begin negotiations at Rutland Township Bog, Kane County.

Pursuant to Resolution 295 adopted at the 47th meeting, the Department's staff had blocked the drainage tile at Volo Bog. The water level in the north end of the bog has been raised 12 to 16 inches. The effects of raising the water level are being watched carefully.

48-7) Next meeting:

It was agreed that the next meeting would be held at Illinois Beach State Park, Zion, on Tuesday evening, October 2, and Wednesday morning October 3, 1973.

48-8) Environmental Protection Agency burning regulations:

There was discussion of the regulations requiring burning permits. Mr. Fell had written to the Illinois Environmental Protection Agency concerning the interpretation of the Pollution Control Board's open burning regulations as they pertain to the burning of vegetation of natural areas, particularly native prairies, for the purposes of maintaining or restoring natural conditions. He had felt that native vegetation would come under the definition of "landscape wastes" under the regulations and that burning without a permit in rural areas was therefore permissible. The EPA had responded that it considers native vegetation to come under the definition of "trade wastes" and therefore a permit must be secured before burning a prairie or other natural area.

48-9) North Fork of the Embarras River, Clark County:

Messrs. White and Hutchison reported on their discussions with the owners of three tracts of forest along the North Branch of the Embarras River and its tributary Doyles Creek. The owners have protected the forest through the years and are interested in preserving it. They are particularly interested in receiving additional protection for the area. The three tracts total approximately 210 acres and are representative of the floodplain, ravine, steep slope, and upland forests of the Effingham Plain Section of the Southern Till Plain Natural Division. This is an outstanding example of old-growth forest with exceptionally large trees and very little disturbance of natural conditions.

There was discussion of the means of protecting the forest and the desirability of dedication of the area by the owners versus acquisition of the land by a public agency.

The tax advantages to the owners from dedication of the property while retaining ownership and the type of participation the State should have in protecting the area were discussed. Director Dean agreed that the State should work with the Commission to develop a proposal to the owners for preservation of the area.

It was moved by Dr. Beecher, seconded by Dr. Durham, and carried that the staff work with the Department of Conservation to develop a proposal and plan for the preservation of the Doyles Creek woodland under private ownership.

48-10) Goose Island Marsh, DuPage County:

Mr. Gerald Paulson of the Commission's staff had prepared a report on Goose Island Marsh upon the request of the Wheaton Planning Department. The marsh is located on the west edge of the city. Part of the area is a stable marsh community that provides habitat for a large bird population. The marsh area is used by classes from Wheaton College. Copies of the report were distributed to the Commission for review.

48-11) Mississippi River Sand Hills, Hancock County:

The Department had drawn up a lease agreement with Western Illinois University for the management of the Mississippi River Sand Hills Nature Preserve. The University lawyers were presently looking at the draft lease, which is similar to the Department's lease with Putnam County Conservation District for George S. Park Nature Preserve. It was decided to table approval of the lease until the University had reviewed it.

48-12) Giant City State Park -- Fern Rocks area, Jackson County:

Dedication of the Fern Rocks area of 170 acres as a nature preserve had been given preliminary approval at the last meeting (Resolution 293).

Upon motion by Dr. Olmsted, seconded by Dr. Durham, and carried the following resolution was adopted:

Dedication as a nature preserve of the following described real property of approximately 170 acres in Giant City State Park, Jackson County, is approved, and the Chairman is authorized and directed to sign the dedication:

That part of the $E\frac{1}{2}$ $E\frac{1}{2}$ lying south and west of the east and north banks of Indian Creek, the $E\frac{1}{2}$ $SW\frac{1}{4}$ $SE\frac{1}{4}$, the $NW\frac{1}{4}$ $SE\frac{1}{4}$, that part of the $NE\frac{1}{4}$ lying south of the north bank of Indian Creek, and a portion of the $NW\frac{1}{4}$ described as follows: beginning at the center of Section 27, thence north along the center line 1,500 feet more or less to the south edge of the pavement of the park road at the west end of the bridge foundation, thence westward 12 feet south of and parallel to the south edge of the pavement 1,000 feet to a point, thence north 12 feet to the south edge of the pavement, thence westward 376 feet more or less to the end of a stone wall at the north-south center line of said quarter section, thence south to a point 693 feet north of the east-west center line of said Section 27, thence east 165 feet to a point, thence south 582 feet to a point, thence east 99 feet to a point, thence south 111 feet to the center line of Section 27, thence east along said center line to the point of beginning; all in Section 27, Township 10 South, Range 1 West of the 3rd PM, Jackson County, Illinois.

Said dedication shall include the following proviso:

The Department may maintain a properly designed bridle path through the western parts of the preserve.

(Resolution 303)

48-13) Lake Murphysboro State Park--Indian Creek, Jackson County:

Mr. White presented a report on the nature preserve potential of two tracts totalling approximately 179 acres within Lake Murphysboro State Park. The area includes upland, ravine, and floodplain forests representative of the Mt. Vernon Hill Country Section of the Southern Till Plain Natural Division of Illinois. Several rare species of plants are found in the area. There was discussion of how dedication of this area fits into the Department's long range plans for the park.

Upon motion by Dr. Durham, seconded by Dr. Beecher, and carried the following resolution was adopted:

The Commission recommends dedication as a nature preserve of the Indian Creek area of approximately 179 acres within Lake Murphysboro State Park and directs the staff to confer with the Department of Conservation concerning the area.

(Resolution 304)

48-14) Prairie Chicken Sanctuaries, Jasper County:

The Prairie Chicken Foundation of Illinois had completed transfer of three sanctuaries totalling 157 acres to the Department of Conservation with the understanding that the tracts would be dedicated as additions to the Jasper County Prairie Chicken Nature Preserve. Preliminary approval for dedication had been given at the 36th meeting in Resolution 172.

Upon motion by Mr. Eisenbeis, seconded by Dr. Warnock, and carried the following resolution was adopted:

Dedication as an addition to the Jasper County Prairie Chicken Nature Preserve of real property of approximately 157 acres in Jasper County, Illinois, owned by the State of Illinois, Department of Conservation, and described as follows:

Parcel 1: The Southeast Quarter of the Northwest Quarter and the West Half of the Southwest Quarter of the Northeast Quarter of Section 27, Township 6 North, Range 9 East of the 3rd P.M., containing 60 acres, more or less, situated in Jasper County, Illinois, except coal, oil, gas and other minerals.

Parcel 2: The East Half of the Southwest Quarter of the Southeast Quarter of Section 28, Township 6 North, Range 9 East of the 3rd P.M., containing 20 acres, more or less, situated in Jasper County, Illinois, except coal, oil, gas and other minerals and rights to mine and remove same.

Parcel 3: The North Half of the Northeast Quarter of Section 28, Township 6 North, Range 9 East of the 3rd P.M., except a tract described as follows: Beginning at the Southeast corner of the North Half of the Northeast Quarter, thence North 37 rods, thence West 13 rods, thence South 37 rods, thence East 13 rods to the place of beginning, containing 77 acres, more or less, and except coal, oil, gas or other minerals, situated in Jasper County, Illinois,

is approved, and the Chairman of the Commission is authorized and directed to sign the dedication. Said dedication shall include the following proviso:

This dedication is made for the primary purpose of providing habitat for the Greater Prairie Chicken (*Tympanuchus cupido pinnatus*), in order to preserve an Illinois population of this species of unusual fauna of educational and scientific value. With the approval of the Illinois Nature Preserves Commission and the Department of Conservation, said real property may be managed for said primary purpose with or without the preservation or restoration of natural conditions and notwithstanding any contrary provision of general rules for management of Illinois nature preserves. The Department of Conservation, with the approval of the Governor and the Illinois Nature Preserves Commission, may void or amend this dedication upon its finding that such voiding or amendment will not jeopardize the Illinois population of said species.

(Resolution 305)

48-15) Ferne Clyffe State Park--Round Bluff, Johnson County:

The Round Bluff area was given preliminary approval for dedication at the 24th meeting, Resolution 81. The Department of Conservation was now ready to proceed with dedication.

Upon motion by Dr. Warnock, seconded by Dr. Durham, and carried the following resolution was adopted:

Dedication as a nature preserve of the following described real property in Ferne Clyffe State Park, Johnson County, is approved and the Chairman is authorized and directed to sign the dedication:

The East 500 feet of the NW $\frac{1}{4}$ SW $\frac{1}{4}$ and the NE $\frac{1}{4}$ SW $\frac{1}{4}$ except the North 100 feet of the East 800 feet and a portion described as follows: starting at the NW corner of said NE $\frac{1}{4}$ SW $\frac{1}{4}$ thence East along its North line 174 feet to a point, thence South 25° West 98 feet to a point, thence South 41° East 100 feet to a point, thence South 62.5° West 86 feet to a tree, thence North 31° West 235 feet to the point of beginning; all in Section 27, Township 11 South, Range 2 East of the 3rd P.M. Johnson County, Illinois.

(Resolution 306)

48-16) Heron Pond-Wildcat Bluff Nature Preserve, Johnson County:

The Department's natural areas staff proposed that the name of the "Management Plan for Heron Pond-Wildcat Bluff Nature Preserve" be changed to "Master Plan for Heron Pond-Wildcat Bluff Nature Preserve" to avoid confusion with the Department's management plans, and proposed that Chapter III, Section 2.0145 of the master plan be amended to read: "Visitors shall not approach the heron rookery beyond the designated trails except by permission of the local custodian".

Upon motion by Mr. Donnelley, seconded by Dr. Beecher, and carried the following resolution was adopted:

The Commission approves the change of the name of the Heron Pond Management Plan to "Master Plan for Heron Pond-Wildcat Bluff Nature Preserve" and the proposed amendment to Chapter III, Section 2.0145 of the master plan.

(Resolution 307)

At the hour of 10:25 p.m. the meeting was recessed. It was reconvened the next day at 8:45 a.m.

There was discussion of the proposed additions to Heron Pond, in particular the Little Black Slough area. Director Dean had talked to the principal owners of this area about possible state acquisition. Mr. White had done further study of the Little Black Slough area and described the area as having considerable old-growth timber with several undisturbed cypress ponds and tupelo swamps. There is a great diversity of ecological situations and abundant wildlife and plant species. The owners of the major part of the area are looking for a buyer for their extensive holdings of land in the vicinity.

Upon motion by Dr. Olmsted, seconded by Dr. Warnock, and carried the following resolution was adopted:

The Commission reaffirms its recommendation to the Department of Conservation made in Resolution 255 for the acquisition of additional land near Heron Pond Nature Preserve and strongly urges the Department of Conservation to make every effort to acquire the area.

(Resolution 308)

48-17) Chicago, Milwaukee and St. Paul Railroad Prairie, Lake County:

A letter had been received from the Deerfield Environmental Commission asking for assistance in preserving a strip of prairie along the Chicago, Milwaukee and St. Paul Railroad in Deerfield. The staff was directed to investigate the area and confer with local agencies about means of preserving the prairie.

48-18) Volo Bog Nature Preserve addition, Lake County:

Dedication of an addition of 112 acres to Volo Bog Nature Preserve and 25 acres as buffer to the nature preserve was presented for final approval. The addition is within the "Krilich tract" which is on the south side of the nature preserve.

It was moved by Mr. Donnelley, seconded by Dr. Durham, and carried that whereas the Commission had considered the matter of dedication of an addition to the Volo Bog Nature Preserve at several prior meetings and is adequately informed thereon, and whereas the circumstances make such action appropriate, the Commission suspends its rules of order and procedure for the purpose of allowing approval of the dedication as a nature preserve of real property of approximately 112 acres owned by the State of Illinois, Department of Conservation and allowing approval of the dedication as buffer to the nature preserve of approximately 25 acres owned by the State of Illinois, Department of Conservation, in Lake County, Illinois.

Upon motion by Mr. Donnelley, seconded by Dr. Durham, and carried the following resolution was adopted:

Dedication as an addition to Volo Bog Nature Preserve of real property of approximately 112 acres in Lake County, Illinois, owned by the State of Illinois, Department of Conservation, and described as follows:

The Northwest Quarter of the Southeast Quarter of Section 28, Township 45 North, Range 9 East of the Third Principal Meridian; the South Half of the Southeast Quarter of Section 28, Township 45 North, Range 9 East of the Third Principal Meridian, lying North of the Centerline of Sullivan Lake Road and North of the Proposed North Right of Way Line of Sullivan Lake Road relocation; The East Half of the Southwest Quarter of Section 28, Township 45 North, Range 9 East of the Third Principal Meridian, lying North of the Centerline of Sullivan Lake Road and North of the Proposed North Right of Way Line of Sullivan Lake Road relocation, all described as follows: Beginning at the Southeast Corner of said Section 28; thence South $89^{\circ} 58' 12''$ West 990.0 feet along the Centerline of Sullivan Lake Road to a point; thence North $89^{\circ} 05' 21''$ West 384.92 feet along said Centerline of Sullivan Lake Road to the point of curvature of a 1722.94 foot radius curve to the right; thence North $0^{\circ} 54' 39''$ East 33.0 feet to a point on the Proposed North Right of Way Line of Sullivan Lake Road relocation; thence Westerly 1606.15 feet along said Proposed North Right of Way Line along a 1687.94 foot radius curve to the right whose chord bears North $61^{\circ} 49' 46''$ West 1546.23 feet

to a point; thence South $55^{\circ} 25' 49''$ West 33.0 feet to a point on the Centerline of Sullivan Lake Road; thence North $34^{\circ} 34' 11''$ West 246.86 feet along said Centerline of Sullivan Lake Road to a point; thence North $30^{\circ} 11' 14''$ West 377.46 feet along said Centerline of Sullivan Lake Road to a point; thence North $50^{\circ} 14' 19''$ West along said Centerline of Sullivan Lake Road to a point on the Centerline of Sullivan Lake Road 590 feet East of the West line of the East Half of the Southwest Quarter of Section 28; thence running 570 feet North to a point and thence running in a straight line Northeasterly to the center of Section 28; thence North $89^{\circ} 21' 15''$ East 1320.0 feet along the East-West Half Section Line of Section 28 to the Northeast Corner of the Northwest Quarter of the Southeast Quarter Section; thence South $0^{\circ} 13' 56''$ East 1323.84 feet along the East line of said Northwest Quarter of the Southeast Quarter Section to the Southeast Corner of said Northwest Quarter of the Southeast Quarter Section; thence North $89^{\circ} 19' 19''$ East 1322.39 feet along the North line of the South Half of the Southeast Quarter Section to the Northeast Corner of said South Half of the Southeast Quarter Section; thence South $0^{\circ} 10' 43''$ East 1323.11 feet along the East line of said Southeast Quarter Section to the point of Beginning, in Lake Co., Ill., excepting therefrom the land hereinafter described and dedicated as buffer for the protection of the nature preserve,

is approved;

dedication as buffer area of approximately 25 acres in Lake County, Illinois, owned by the State of Illinois, Department of Conservation, and described as follows:

That part of the South Half of Section 28 lying within 100 feet northerly of the Centerline of Sullivan Lake Road and of the Centerline of the Proposed Sullivan Lake Road relocation; and the South 400 feet of the South Half of the Southeast Quarter of Section 28 all in Township 45 North, Range 9 East of the Third Principal Meridian, in Grant Township, Lake County, Illinois,

which buffer area shall be held for the protection of the nature preserve and may be developed, maintained, and used for such public nature preservation, conservation, recreation, and highway purposes as may be approved by the Illinois Nature

Preserves Commission and the Department of Conservation,
is approved; and

the Chairman of the Commission is authorized and directed
to sign said dedications.

(Resolution 309)

48-19) Rocky Glen, Peoria County:

Mr. Fell presented an acquisition project proposal report for Rocky Glen which the staff had prepared. He had proposed to the Department of Transportation that the alignment of the proposed FA Route 9 which will go across the north part of the Rocky Glen area be altered but had obtained no commitment. The Peoria Park District owns land adjoining this area and is very much interested in acquiring the Rocky Glen area. It was agreed the staff should continue its efforts to have the area preserved.

48-20) Beall Woods Nature Preserve, Wabash County:

Director Dean reported that on June 28th another break had occurred in the 30-year old oil pipeline that crosses the nature preserve and Coffee Creek. He had gone to Beall Woods to investigate the oil spill and had ordered emergency clean-up operations. The Department is looking into means of eliminating the threat of additional oil spills in the watershed of Coffee Creek.

Mr. Standish reported that because money from the Land and Water Conservation Fund was used in the purchase of Beall Woods, the Department of the Interior was taking an active interest in protection of the Woods. The Federal Environmental Protection Agency is also involved because of the oil spills that have occurred.

Both the Department of Conservation and the Fish and Wildlife Service have discussed with the Bureau of Mines the threat of subsidence of the ground in the nature preserve from future mining of the coal beneath the woods. The Bureau of Mines may make a study of the area and it may be possible to work out a mining method that will avoid any measurable subsidence in the nature preserve.

Mr. Standish suggested that a meeting between the U.S. Fish & Wildlife Service, the Department of Conservation, the Nature Preserves Commission, and the Environmental Protection Agency be arranged to coordinate action relating to Beall Woods.

It was moved by Mr. Donnelley, seconded by Dr. Durham, and carried that the Commission's officers and staff work closely with Federal and State agencies involved in the protection of Beall Woods to find a solution to the threat of additional oil spills in the nature preserve and that the officers and staff shall have the authority to act in behalf of the Commission on the elimination of this hazard.

Mr. Fell reported on the Corps of Engineers hearing he had attended in Vincennes, Indiana on May 23 on the Cross-Wabash Valley Waterway. He had sent a letter to the Louisville District of the Army Corps of Engineers expressing the

Commission's concern about possible adverse effects on the ecology of Beall Woods and other natural areas in the Wabash River valley from the proposed waterway. Mr. Standish reported that the U.S. Fish & Wildlife Service was looking carefully at this proposal.

48-21) Busse Forest Nature Preserve, Cook County:

Mr. Fell reported on the present situation of the Upper Salt Creek Watershed Project as it affects Busse Forest Nature Preserve. Approximately 4.2 acres of woodland in the nature preserve and part of the old fields along Salt Creek would be inundated by the permanent pool. Additional land would be inundated during flood periods. The Commission had proposed certain requirements be met to protect the natural forested area of the nature preserve from inundation by the proposed reservoir. Governor Walker had announced that funds would be made available to start the project this year.

Dr. Klimstra read a letter from Arthur L. Janura, General Superintendent of the Cook County Forest Preserve District, which proposed that most of the portion of the nature preserve lying in the west half of Section 17 be withdrawn from the original dedication because of the problems the District felt would be involved in installing dikes as a flood preventative measure for the preserve.

It was agreed that additional on-site survey work was needed to check the elevations of critical areas of the preserve and to evaluate the vegetation of the areas involved. The Chairman appointed Dr. Olmsted and Dr. Beecher as a committee of the Commission to consider the matter with Mr. Fell and Mr. Eisenbeis and to recommend a course of action to the Commission. The Commission could then make a decision by mail vote if necessary.

48-22) Robeson Hill Nature Preserve, Lawrence County:

The Commission had received notice of a hearing in Lawrenceville on the design of a rest area on U.S. Route 50, adjacent to Robeson Hill Nature Preserve. The staff will attend the hearing.

48-23) Adjournment:

It was moved, seconded, and carried at the hour of 10:30 a.m. that the meeting be adjourned.

George B. Fell
Executive Secretary

Gaylord Donnelley
Acting Secretary

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ILLINOIS NATURE PRESERVES COMMISSION

EXPENSE SUMMARY 1972 - 1973 FISCAL YEAR

<u>Printing, Paper supplies</u>	\$ 97.15
<u>Commodities, Office supplies</u>	4.92
<u>Travel, Commission members</u>	943.86
<u>Contractual services</u>	
Personal services	\$43,450.30
Unemployment compensation liability	635.38
Travel, personnel	6,929.08
Rent, utilities, office equip. use & sundry operating costs	3,012.00
Telephone	1,386.39
Postage	888.37
Supplies, field & office	172.93
Books, maps, photos	410.48
Duplicating & paper	2,632.20
Commission meeting expenses	504.99
Miscellaneous	1.75
	<hr/>
	60,023.87
Total	<u>\$61,069.80</u>

FY'73 appropriation for nature preserve purposes	\$67,800.00
Expended by Nature Preserves Commission	61,069.80
Expended by Department Natural Areas Section	6,552.93

ILLINOIS NATURE PRESERVES COMMISSION
FORTY-NINTH MEETING

STAFF REPORT

* Refer to accompanying documentary material

A) Staff activities

July - September

B) Meetings & conferences attended by staff

7/12 Busse Woods (Salt Creek impoundment) field meeting (Fell)

8/2 Robeson Hills rest area hearing, Lawrenceville (Hutchison)

8/16 Illinois Beach management planning meeting, Illinois Beach State Park (Paulson)

8/23 Beall Woods oil spill conference, Springfield (Fell)

C) Special use permits granted

Alvin T. Clausen -- documented study of the vascular flora--Sand Prairie-Scrub Oak
Nature Preserve, Mason County

D) Natural Land Institute acquisitions

<u>Project</u>	No. of <u>tracts</u>	No. of <u>Acres</u>	Paid out Prior to <u>6/30/73</u>	Sold since <u>6/30/73</u>	Total <u>Commitment</u>
Easton Prairie	2	.94	\$ 3,220		\$3,220
Big Bend	1	97.64	35,000	\$35,000	
			\$38,220	\$35,000	\$3,220

Conveyance of the Wilkins tract (Big Bend), LaSalle County, from Natural Land Institute to the State was completed on July 2, 1973.

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E) Status of Commission-approved dedications

The following areas have been dedicated as nature preserves since the last meeting:

Addition to Volo Bog Nature Preserve, Lake County and Jasper County
Prairie Chicken Sanctuary

Reavis Spring Hill Prairie (Otterstrom tract), Mason County (No. 45)

Harlem Hills (Easton) Prairie, Winnebago County (No. 46)

Round Bluff in Giant City State Park, Jackson County (No. 47)

Fern Rocks in Ferne Clyffe State Park, Johnson County (No. 48)

Dedications awaiting approval of the Director of the Department of Conservation
and the Governor:

Bartlett Woods, Lee County

Dedications awaiting approval of the owner (The Nature Conservancy), Department
of Conservation and the Governor:

Baber Woods, Edgar County

Cedar Glen, Hancock County

F) Commission publications and reports

Approximately 1,300 copies of the Biennial Report and Guidelines have been
distributed. Copies of The Natural Divisions have been distributed to approximately
450 persons.

G) Illinois State Clearinghouse

Notifications of all proposed projects relating to transportation and natural resources
are now being received from the Illinois State Clearinghouse.

H) DuPage County -- Goose Island Marsh and Will County -- Sag Valley Site

The staff has responded to the Department's request for a comparison of the nature
preserve values of the two sites.

1. The first group of authors (e.g., [1, 2]) considers the problem of the stability of the motion of a system of particles in the field of a central force. The results of the calculations show that the system is stable for all values of the parameters of the system.

I) Kane County -- Trout Park Nature Preserve

The Elgin Parks Department is undertaking initial trail improvements in the nature preserve.

J) Kane County -- West Valley Development

The staff has been reviewing the proposed New Town development near Elburn to determine possible impact on nearby natural areas.

K) Lake County -- Chicago, Milwaukee & St. Paul Railroad Prairie

Mr. Paulson has surveyed the area and is working with the Deerfield Environmental Commission to find means of protecting the prairie.

L) Lake County -- Illinois Beach Nature Preserve

The staff has met with the Department's Natural Areas Section and the interpreter at Illinois Beach State Park to discuss realignment of the nature trails in the preserve. The Bob-O-Link Trail has been permanently closed due to flooding and several areas along the Dead River Trail have been impassable for extended periods. The Dead River Trail is to be relocated on drier ground. The Department's staff is studying alternatives for crossing wet swales.

M) McHenry County -- Lake Defiance

The staff has been working with the Department's Natural Areas Section towards dedication of two large natural areas in the new State park.

N) Piatt County -- Allerton Park (Oakley Reservoir)

Letter from Governor Walker, 8/22/73

Letter from Dr. Klimstra to Governor Walker, 8/29/73

* Letter from Dr. Kendeigh to Dr. Klimstra, 9/20/73

O) Putnam County -- Miller-Anderson Woods Nature Preserve and George S. Park Nature Preserve

Annual reports have been received from the Putnam County Conservation District on the management of the nature preserves which are under lease to the District.

P) Rock Island County -- Loud Thunder Forest Preserve

Mr. Paulson has met with the Chairman of the Rock Island Forest Preserve District Board and the Forest Preserve District Executive Committee to discuss possible dedication of a portion of this area.

Q) Vermilion County -- Middle Fork of the Vermilion River

The staff has received a copy of the Vermilion County Conservation District's environmental assessment report for the proposed reservoir on the Middle Fork.

R) Winnebago County -- Harlem Hills (Easton) Prairie Nature Preserve

Fencing is being installed on portions of the area by the Natural Land Institute. The Department of Conservation is planning to fence the remainder.

Permanent vegetational sampling points have been established and the vegetation has been sampled to monitor changes in vegetation resulting from future management.

10/17/1961 - 10/18/1961

1. The Commission has been informed that the Government of India has decided to set up a Commission to inquire into the activities of the Communist Party of India (CPI) and its front organizations in the State of Kerala.

ALL INFORMATION CONTAINED HEREIN IS UNCLASSIFIED

[illegible]

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DEPARTMENT OF ZOOLOGY • COLLEGE OF LIBERAL ARTS AND SCIENCES

4/24/74
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September 20, 1973

Dr. W. D. Klimstra, Chairman
Illinois Nature Preserves Commission
Cooperative Wildlife University
Carbondale, Illinois 62901

Dear Bill,

I was interested in seeing a copy of Gov. Walker's letter to you of August 22 concerning the Oakley Reservoir.

It is my understanding that there is plenty of underground water for future Decatur needs. I am surprised at the Governor's statements in this regard.

There is real concern that the water quality in Lake Springer will not be acceptable because of heavy nitrogen runoff from surrounding farmlands. Proponents of the project have not satisfactorily answered this objection.

Point 4 in his letter is a matter of relevance to the Commission and one in which the Commission should become directly involved. The Army Corps of Engineers admits there will be increased flooding above natural in Allerton Park. This change in flooding pattern will change the ecology of the park. This is a basic ecology principle. The critical word in this statement of the Governor's is the word "significantly".

Of concern to many of us, is who is to judge whether or not the change in flooding pattern and ecology is significant. Is the Governor going to take the word of the Army Corps of Engineers? Or possibly the Department of Conservation? It seems to me that this evaluation should be done by the Nature Preserves Commission. I urge that the Commission take steps to offer its services in this regard and to point out to the Governor that it is best qualified to render a decision that would be acceptable by the general public.

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Dr. W.D. Klimstra - Page 2

The Governor further points out that funds are being supplied to the University of Illinois for maintaining a series of surveys both before and after the reservoir becomes functional. These data are being put into the computer and perhaps in a few months further information, similar to that given by Elden Franz, will become available as the changes in the biota that will be produced. There still remains the matter as to how much alteration in ecology will be tolerated. Most of the University scientists involved in the project are only casually interested in the preservation of natural areas and I do not think should be the ones to render the judgment as to whether the changes are "significant".

Obviously, these surveys will only show what is already taking place or will take place. They cannot "make sure that the ecology is not seriously disturbed."

I hope the Nature Preserve Commission will continue to be aggressive for reaching a favorable verdict in this controversy.

Very truly yours,

S. Charles Kendeigh
Professor Emeritus of Zoology

CC; George Fell
SCK:mln

Illinois Nature
Preserves Commission
September 21, 1973
John White

PRESERVATION OF CAVES IN ILLINOIS

SUMMARY

Caves have natural and scientific values worthy of preservation. However, protection of caves is difficult because they are highly vulnerable to vandalism and improper land management. The many caves in Illinois illustrate a diversity of geological and biological features. Certain of these caves are of national significance and merit preservation, and others should be protected as representatives of the various kinds of caves in the State.

PRESERVATION VALUES OF CAVES

Scientific value

Caves provide a unique, stable, and simple environment for scientific studies. Cave research (speleology) is not only basic to the understanding of caves and cave life, but it also extends beyond these limits to more-general knowledge in each particular field of study. The study of caves has practical applications, for ignorance of caves and cavernous terrains can lead to unwise actions and serious misfortune. Many benefits to the public can be derived, however, by the proper management and use of cave systems. Following are some of the ways in which caves are useful to science:

Ecology.-- Caves are valuable natural laboratories because the ecology of the cave is relatively simple and stable: the temperature fluctuates within a few degrees of the mean annual temperature of the region; relative humidity is fairly constant (usually nearly 100 per cent); lighting conditions are constant (absent); energy sources and food chains can be identified. Cave communities are simple and can be defined, so that they can be studied as a whole. The concepts developed by studies of the ecology of the cave can be useful in understanding surface ecosystems that are so complex and variable that they can hardly be defined.

Biology.-- The opportunity for biological research in caves is unlimited. For instance, in evolutionary studies there are questions about the mechanisms of isolation, differentiation, and adaptation to the cave environment by which troglobites (animals that can live only in caves) evolve; and there are opportunities to study degenerative evolution and lack of genetic variability in a simple and stable environment. In the physiological and behavioral sciences, there are intriguing problems involved with circadian (daily) and circinnian (annual) rhythms in an environment without cyclic fluctuation; growth rates and metabolic efficiency in an environment of meager food supply; and predation and protection mechanisms in total darkness. Biogeographers have studied the climatic and geological implications of the distribution of cave animals. Although biospeleology is a young science, some species and groups of cave animals have been studied sufficiently to make some valuable contributions to science.

Paleontology and archeology.-- Some caves are outstanding repositories of bones, artifacts, and debris from ancient times. The remains may have been left by men or animals that occupied the entrance; or the remains may have washed into the cave; or the cave may have acted as a natural pitfall. If the bones, plant materials, and artifacts are well preserved and found in situ or in stratified deposits, a wealth of information about ancient man and changes in the environment can be obtained.

Few true caves in Illinois show evidence of aboriginal occupation, because there are few caves with entrances suitable for habitation, and Illinois caves do not have the kinds of mineral resources that were exploited by Indians. Important bone deposits have been found in Meyer Cave in Monroe County and Brown's Hole in Hardin County.

Geomorphology and hydrology.-- Some present-day caves developed long ago, before the existing topography had developed. Their formation was related to the topography at some earlier period, and the caves resulted from ancient patterns of groundwater flow. In some cases these caves, especially their solutional features and sediments, are the only evidences of the ancient landforms and drainage systems: erosion has completely destroyed the surface features. Such caves are invaluable in reconstructing the geomorphic and hydrologic history of a region.

Many benefits can be derived from study of actively-forming caves and cave systems. Investigation of caves and cave-forming processes is important in understanding the morphology of limestone terrains. This aids in determining the best means of constructing roads and buildings to avoid subsidence, catastrophic collapse, and disastrous changes in patterns of groundwater flow. Study of groundwater flow in cavernous regions not only has many theoretical applications, but provides practical information on water quality, storage, and supply; and can help avoid expensive mistakes in location of reservoirs. Also, study of the erosional

and depositional features within a cave adds to the knowledge of not only how caves form, but how basic geological processes work.

Minerology.-- Most secondary mineralizations (such as flowstone and stalactites) are deposits of the same mineral (calcite) that was dissolved to form the cave. The processes and delicate equilibria involved in solution and precipitation of cave minerals are complicated. Every cave seems to have different forms of speleothems (cave "formations"), and some minerals are known from only a single cave. The situation is complicated by the fact that bacteria play a role in formation of some minerals. As in the other sciences, there is no lack of opportunity for research in caves in the field of minerology.

Educational value

A cave with the proper characteristics (accessible, suitable for groups of people, etc.) can be a valuable teaching aid. Properly conducted, a visit to a cave by a school group can be stimulating and rewarding. During such a visit is the time not only to learn about the cave and its contents, but also to learn basic cave conservation practices. Many students have conducted advanced research in caves.

Aesthetic value

The beauty of some caves -- from the grandeur of high canyons and waterfall domes, to fantastically shaped crystals -- is indescribable. Illinois is not well endowed with beautiful caves: the climate is too cool for massive deposits of flowstone and dripstone, and rarely does the geology favor gypsum crystals and rare minerals. Some Illinois caves are impressive even to the sophisticated caver, but no cave in the State is of national significance from the aesthetic standpoint.

Wilderness quality

Wilderness can be defined in three ways: 1) Wilderness is land untouched by man. 2) Wilderness is land where the effects of man's activities are substantially unnoticeable. 3) Wilderness is land that gives one the psychological feeling of remoteness from civilization. All three kinds of wilderness may be experienced in Illinois caves.

To the average person, traveling for a few thousands of feet through an undeveloped cave is exploring wilderness, and some people derive a satisfactory wilderness experience from touring a commercial cave. The darkness and mystery of a cave has a curious psychological effect on the explorer: small streams are called rivers; pools are called lakes; mounds of rocks are called mountains; "bottomless pits" are 30 feet deep; and "cave miles" are 1000 feet long. Many caves are so difficult to traverse and so extensive that anyone can reach his limits of endurance, skill, and courage. It is pos-

sible to travel for miles in some caves; and when a caver is 5 miles from the nearest entrance, he is 5 miles removed from civilization, even though a house may be 100 feet overhead. With a little determination it is possible to explore passages that nobody has ever before seen. In Illinois there are miles of unexplored passages, and scores of caves remain undiscovered. There is probably only one, if any, cave in Illinois that is over 10 miles long, but the large cave systems in Monroe County are the most complete wilderness areas in the State. These caves have a level of underground wilderness quality exceeded in the Midwest by only a few larger, more-difficult caves.

THREATS TO CAVES

Quarries and road construction destroy caves by filling or simply eliminating them. Such earthmoving projects also damage caves by opening new entrances and closing natural ones. This alters the temperature, humidity, and composition (percentage of carbon dioxide) of the cave atmosphere by altering patterns of airflow. Reservoirs damage caves by flooding, or by disrupting the natural flow of water through the cave. Besides such obvious threats to caves, there are many others.

Fragile features of a cave are the objects of intentional vandalism and carelessness, or "unintentional vandalism." Breaking or removing stalactites, or marking on the walls is obviously damaging: a stalactite that has been growing for thousands of years can be destroyed in an instant. Although a cave is formed from rock, it is one of the most fragile products of Nature. Footprints made thousands of years ago are visible today; and, knowing this, conscientious cavers stay in a narrow path when exploring dry virgin passages. Careless explorers muddy and break delicate and pristine formations simply by traversing the cave, and some passages are so full of delicate formations and crystals that they are ruined forever if they are entered. The composition and stratification of sediments are invaluable in deciphering the history of a cave, as are flow lines, ripple marks, and dessication cracks in mud in passages that no longer flood. Few people realize the significance of sedimentary features, so in heavily traveled caves the floor sediments are generally completely trampled. In their determination to enter unexplored passages, cavers dig, move rocks, and even feel justified to break stalactite chokes.

The worst-vandalized caves are the best-known and most-accessible: often these are in public ownership. Caves in state parks are generally stripped of formations, heavily trampled, and strewn with trash. It is difficult to determine whether some remote spring caves in southern Illinois have ever been entered, because there is no vandalism. But similar, well-known and accessible caves in the same vicinity are heavily abused.

Cave communities are simple, but they are stable in their

natural environment. However, they are easily subject to simplification by destruction of species from unnatural environmental fluctuation; this leads to further instability and alteration of the community. Rare kinds of cave life are more readily exterminated than surface forms, because whole species or communities restricted to a single cave can be destroyed without the chance for repopulation from adjacent areas. Subsurface streams can carry silt and pollutants great distances relatively rapidly, without the benefit of natural filtration. Because much of the life of the cave is intimately related to water, the living things are vulnerable to changes in water quality. Garbage left by man in caves disrupts the natural balance of cave life. (For instance, cave crickets may become overabundant.) The mere continued or frequent presence of man, such as in show caves and during caving expeditions, has been shown to alter the distribution and relative abundance of cave animals far beyond the immediate area of disturbance.

Collecting rock formations and animals is usually damaging to the cave. Judicious collecting of invertebrates for research can be done with a minimum of disturbance, however.

PROTECTION AND PRESERVATION OF CAVES

In addition to protecting caves from destruction by road construction, etc., caves must be protected from less-obvious damage by uncontrolled visitation and from unwise land use.

Caves can be protected from visitors by limiting access and by educating visitors about cave conservation practices. Access to a cave can be limited by gating or by keeping its location secret. Some people feel that all cave locations should be confidential information; others feel that publicity and education about caves will protect them. The former view is unrealistically restrictive, and the latter view has been proven ineffective: a middle view that urges education as well as control of access to fragile caves is probably the best. Controlling access is difficult, for cave gates are almost invariably rendered inoperative, and the location of a significant cave never stays secret for long. Some people feel that the most realistic protection is a gate that thwarts casual visitors but can be bypassed by determined visitors. It is felt that casual visitors are the most likely to be vandals.

Commercialization for tourist trade gives a cave some degree of protection from vandalism. However, alterations such as walkways, electric lights, and artificial entrances affect the natural environment.

Some states have laws to protect caves by prohibiting the damaging or removal of natural features and life of the cave without permission from the owner. There are no such Illinois statutes relating to caves, and there have been no court cases involving caves in Illinois. Regular property laws would have to be applied

in attempts to protect a cave by controlling its use, or the use of the cave's watershed. An agreement with a landowner to restrict use of the cave or the land above it could take the form of a deed, lease, or easement. Such a contract would have to be made on an individual basis, and any sort of legal contract that could be agreed upon by both parties and that would extend protection to the cave would be acceptable. Such a contract would require the owner to surrender some of his rights to the cave or the land, and the owner would probably require compensation for this loss.

According to the Environmental Protection Act, it is illegal to contaminate natural waters, including groundwater such as flows through caves. However, the problems of detecting pollution and proving the source of pollution in caves would be so difficult that it would not be practical for the Environmental Protection Agency to enforce the anti-pollution laws.

CAVES IN ILLINOIS

Distribution

Compared to neighboring Missouri and Kentucky, there are few caves in Illinois. However, there are about 350 caves known to the Illinois Speleological Survey, and perhaps as many as 300 caves remain unreported. Most of Illinois is part of the Illinois Basin, which consists largely of rocks that do not form caves. Also, most of the State is covered by glacial drift, which has filled and masked untold numbers of caves. For these reasons the main cave areas are limited to 1) the outcrop of Mississippian limestones in the Shawnee Hills, 2) the Madison-Monroe-Randolph County sinkhole plains, 3) the bluffs of the Mississippi and Illinois rivers, and 4) the Driftless Area of northwestern Illinois. There are minor areas of karst topography elsewhere in the State, especially in north-central Illinois.

Kinds of caves

Caves are formed by solution of limestone (and other rocks) by slightly acid water. Groundwater circulates most freely along joints (vertical cracks in rocks) and bedding planes (horizontal separations between layers of rocks), so caves originate and develop along joints and bedding planes. Groundwater may be classified as either vadose (above the water table), or phreatic (below the water table, which is the upper limit of complete saturation by groundwater). Using the above terminology, caves may be classified according to their genesis. Some caves have had a complex history and do not fit into any category, but the following are the basic kinds of caves in Illinois:

Joint-controlled caves formed by horizontal vadose solution.-- These are actively-forming caves that usually can be entered via a spring orifice, or at least have an outlet through a spring. The passages are developed along intersecting joint planes; and, like

surface streams, the passages become smaller upstream. These caves are usually less than 500 feet long, and are most common in the Shawnee Hills.

Caves formed by horizontal vadose solution along a bedding plane.-- These caves are forming in a manner similar to joint-controlled spring caves, but the erosion is mostly lateral, along a bedding plane, and is not controlled by joints. The water usually issues from a spring entrance, and often there is only one low, meandering main stream passage, fed by small tributaries. This type of cave can be found mostly in the Shawnee Hills and along the Mississippi River and its smaller tributaries.

Joint-controlled caves formed by vertical vadose solution.-- These caves are usually short and narrow, are restricted to a single joint or a few intersecting ones, and are actively forming. (A large, inactive exception is Griffith Cave in Hardin County.) In the Shawnee Hills such caves form in limestone directly beneath a sandstone caprock, and their entrances are in the face of a bluff, at the sandstone-limestone contact. In the Monroe County sinkhole plain, they are usually at the base of a sinkhole, and often are little more than narrow, unroofed fissures for descending water. This type of cave is often quite common under the proper geologic conditions.

Joint-controlled caves formed by phreatic solution.-- Most of these caves have a network pattern, although a sediment fill obscures the true extent and interconnectivity of the passages. Often a small vadose stream, which had no role in the initial development of the cave, is removing the sediments. Southern Illinois has many fine examples of this type: Equality Cave (Saline County) is a classic. Other caves (such as Freize Cave in Pope County and Lilly Cave No. 1 in Union County) are joint-controlled in their structure, but exhibit various degrees of enlargement along a bedding plane.

Caves of the northwestern Illinois lead-zinc district.-- These are fissures along joints and shear planes that have been enlarged by groundwater solution, and then invaded by mineralized hydrothermal solutions. Many of these cavities can hardly be called caves, because they have been modified and enlarged by mining. However, they are of geological and historical significance.

Cavities formed by deep phreatic solution.-- These cavities were formed relatively long ago, and deep beneath the water table. They are mostly along the bluffs of the Mississippi River and along the Illinois River and its tributaries, where their entrances have been exposed by erosion. Some such solution cavities are too small to be entered by man, and are not considered caves. Others are larger, but still are little more than "spongework" and bedding plane openings. Still others, such as Fults Saltpeter Cave (Monroe County), are remnants of large, integrated chambers for groundwater circulation.

Caves formed by water flowing horizontally at or near the water table.-- Caves such as Burton Cave (Adams County) and Twin Culvert Cave (Pike County) probably served as conduits for relatively swift-flowing streams that completely filled the passage, at least during most of the caves' development.

Phreatic caves modified by vadose water.-- Often cavities that were well integrated by phreatic or water-table solution have been invaded and modified by vadose water. Such modification may be by vertically descending water or by conventional, free-surface streams. Guthrie Cave (Union County) and Ava Cave (Jackson County) are two large examples of the many caves of this type. Cave Spring Cave in Hardin County is a classic example of a pre-existing chamber that is being "destroyed" by a vadose stream.

Active stream passage caves beneath a sinkhole plain.-- These systems are sometimes large and diverse. They are being formed by underground streams fed by a sinkhole plain. The largest caves in Illinois are of this type: Fogelpole Cave, Illinois Caverns, and the O'Leary School - Dry Run System (all three in Monroe County).

Up to this point only caves formed by erosion (mainly solution) of limestone (or dolomite) have been discussed. However, there are sandstone caves in Illinois, particularly in the Shawnee Hills. There are the following general types: 1) Shelter caves formed by erosion of weak rocks (often shale) beneath a massive sandstone cap, with subsequent partial collapse of the overlying sandstone. Most of the spectacular shelter caves in southern Illinois are of this type. 2) Narrow, linear caves formed from erosion by small, intermittent streams descending along a joint plane that is roughly perpendicular to the face of a sandstone bluff. 3) Caves formed by collapse of sandstone into an underlying limestone solution cavity. Bat Cave (Jackson County) and Sand Cave (Pope County) are probably examples. 4) Caves formed by slippage of sandstone blocks along joints and bedding planes. 5) Small caves formed by differential weathering of sandstone cliffs.

Preserving Illinois caves

In considering guidelines for preserving caves in Illinois, it must be realized that no two caves are the same, and that the basic kinds of caves in Illinois vary according to each cave's geologic setting and history. Also, biological phenomena should be considered.

There is no question that certain caves should be preserved, because they are so outstanding and unique. Equality Cave (Saline County) is an extraordinary phreatic maze, in some ways more outstanding than Cameron Cave in Missouri, which has been included in the National Register of Natural Landmarks. Large and beautiful Cave Spring Cave in Hardin County is part of a classic example of karst stream piracy. This cave is also used by thousands of gray bats, a rare species in Illinois; it is the probable site of an

old collection of the very rare spring cave fish (Collogaster agassizi); and it is the only known location for Pseudanophthalmus illinoisensis, a carabid cave beetle of great interest to biogeographers. Fults Saltpeter Cave is the only known locality for the pseudoscorpion Mundochthonius cavernicolus, the first cave-dwelling species of this genus found in the United States. Cave in Rock is not even considered by some people to be a cave, because sunlight penetrates every part of it; but from the speleogenetic standpoint it is one of Illinois' finest caves. Cave in Rock also has had a rich human history. The large karst plains of Hardin and Monroe counties are of national significance.

Illinois caves are so poorly known as a whole that it would be impossible to make specific recommendations about what individual caves should be preserved to represent each kind in the State, and to adequately protect the cave life of Illinois. Many caves are already in State ownership or are near public holdings. There are karst features in the Fults Hill Prairie & Kidd Lake Marsh Nature Preserve, and Fults Saltpeter Cave has been recommended for acquisition and addition to this nature preserve. Another cave is just north of Fults Hill Prairie. There is sinkhole topography in the Lusk Creek Canyon Nature Preserve acquisition area. Twin Culvert (Pike County) and Burton Cave (Adams County) have been considered for nature preserve dedications. There are caves near the Kankakee River Nature Preserve, and several caves are in or near state parks, especially Mississippi Palisades State Park and Pere Marquette State Park.

Dedication of a cave as a nature preserve may protect it from destruction by public works projects, but in some cases it would be difficult to manage and properly protect the cave. Simply dedicating a cave as a nature preserve could stimulate vandalism and might not protect it from surrounding influences. Dedication would give the cave publicity and probably would not discourage vandalism and uncontrolled visitation unless the cave were strongly gated and continually patrolled. Continued vandalism of a cave that has been essentially ruined may not further significantly degrade the natural character of the cave, but such reasoning should not be a part of the Nature Preserves System. Unless the entire cave and its watershed is dedicated as a nature preserve, there may be problems with pollution and siltation, and with destruction of that part of the cave outside the nature preserve: this would usually harm the whole cave.

Part of the value of the Illinois Nature Preserves System is the recognition given to the natural features being preserved. The significance of caves in Illinois has not been fully realized, and it would be impossible to preserve all of them for scientific research. Rather, the investigations, at least partial inventorying of caves and cave life, must precede efforts to establish a comprehensive system of cave preserves. In cases, dedication might not preserve the cave, but may be a detriment to both the cave and the Nature Preserves System. Caves are unique geological and bio-

logical phenomena; but because of the special problems involved in management, care must be taken in the selection of caves to be dedicated as Illinois Nature Preserves.

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Max Hutchison &
John White

THE YELLOWWOOD, A RARE TREE IN ILLINOIS

SUMMARY AND RECOMMENDATIONS

The yellowwood tree is a rare and endangered species in Illinois with only one known stand of less than 100 individual trees located in this study. Unnatural disturbances have affected and probably have reduced the stand from its original range. The trees seem to be in a generally poor condition with many dead or dying with live basal sprouts.

Since an important objective of the Illinois Nature Preserves system is to preserve habitats of species of native plants and animals that are vanishing, rare, or restricted in range, the preservation of the area of the yellowwood stand in the Ozark Hills of Alexander County is of particular concern. As most of the area is owned by the U. S. Forest Service as a part of the Shawnee National Forest, the recommendations for protection of the tree are made with their objectives and management program in mind. The primary recommendations are for preservation of the site and encouragement of study of the stand to help in the management and protection of the tree in the future.

INTRODUCTION

The occurrence of the yellowwood (Cladrastis lutea) in Illinois is significant to the forest ecologist and plant geographer, but because of its rarity and lack of commercial value, it is little known and seldom recognized in Illinois. Consequently the single known stand has been disturbed by land clearing, timber cutting, grazing, and timber stand improvement practices. It has almost certainly been eliminated from parts of its original range by such disturbances.

The Illinois Nature Preserves Commission, concerned for the protection of rare and endangered species, has attempted by this study to determine the status of the yellowwood in Illinois, and to make recommendations for its preservation. Efforts were made to determine: the natural history of the tree in general, the history of its occurrence in Illinois, the present extent of its range in Illinois, the character of the site of

its occurrence, and its preservation values; and then to make recommendations for adequate preservation of the stand.

Information was collected from many sources in the literature (see References), and a number of professional botanists and foresters were contacted from Western Kentucky University, Southern Illinois University, the Illinois Natural History Survey, the Illinois Department of Conservation, and the U. S. Forest Service. U. S. Soil Conservation Service personnel of Alexander and Pulaski counties, as well as several local landowners in the Olive Branch and Tamms area were contacted for information concerning the yellowwood. The reported sites of collections were field checked and efforts were made to determine the extent of the stand. Much of the area was walked and the location, size, and condition of each tree found was noted. Notes were also taken of the character of the site of many individual tree locations such as slope, geology, soils, and associated plant species. Many other comparable sites in Union, Alexander, and Gallatin counties were checked for yellowwoods mostly in conjunction with other field survey activities of the Illinois Nature Preserves Commission staff. Collections were checked in the herbaria of the University of Illinois, Missouri Botanical Garden, Illinois State Museum, Southern Illinois University, and the Illinois Natural History Survey for records of occurrence. Certainly, not every yellowwood tree was located in this study, but hopefully enough of the stand was found to indicate the present condition and extent of its occurrence in Illinois.

DENDROLOGY

The yellowwood has one of the most restricted ranges of any eastern North American hardwood. Its range extends from extreme western North Carolina, through central Kentucky and Tennessee, extreme northern Georgia and Alabama, and southern Indiana and Illinois, to the Ozarks of Missouri and Arkansas, and northeastern Oklahoma. Within its range it is further restricted to small populations. It occurs sparingly in the Appalachian Highlands of eastern Kentucky and Tennessee, but it is more abundant along river bluffs in the Interior Low Plateau of central Kentucky and Tennessee. In Illinois it is known from one location at the southern tip; to the east only one small stand is known in southern Indiana. To the west it occurs in the Ozarks of Arkansas and extreme southwestern Missouri, and in northeastern Oklahoma.

The tree grows best on fertile, well-drained soils on mesic slopes, in valleys, and on river bluffs. It reaches its greatest abundance on the limestone and dolomite river bluffs in Missouri and central Kentucky and Tennessee.

The disjunct populations of the yellowwood throughout its range are interpreted as relicts of a formerly more widespread

distribution. Braun (1950) places great importance on the distribution and ecology of the yellowwood and other mesophytic species in understanding the long history of development of the deciduous forests of eastern North America. The yellowwood exhibits the characteristic distribution of a member of the ancient Ozark-Appalachian flora, for it grows in the Ozark Plateau, in the southern Appalachians, and along a narrow band separating the two mountainous regions. This land mass is the largest and oldest area that has been continuously available for occupation by flowering plants in eastern North America, since the close of the Paleozoic Era, 230 million years ago. This upland has not been invaded by ancient seas, and it is south of the limit of Pleistocene glaciation. The ice sheets advanced the farthest south, and the ancient seas flooded the farthest north, in southern Illinois. All that remains as a bridge for the Ozark-Appalachian flora is the Shawnee Hills and the southern part of the Ozark extension into southern Illinois. During much of the Tertiary Period, which began 63 million years ago, the Appalachian area and the Ozark region were areas of low relief, and on this land surface some of the ancient mesophytic species such as the yellowwood may have developed. Following an uplift at the close of the Tertiary, the region became drier, and the yellowwood and associated mesophytic species were eliminated, surviving only as local relicts where suitable habitat is still available. One of the best discussions of the above theories is given by Steyermark (1934).

The yellowwood does not often become an overstory tree because of its small to medium size and its habit of growth. The trees are usually multiple-trunked, and the trunks fork near the base and support a crown of many branching, ascending limbs. The crown is usually narrow in forest conditions, but in open situations the crown is broad, with spreading and pendulous branches. The trunk is smooth and gray like that of the beech, and the limbs are rather brittle. (*Cladrastis* means "brittle branch" in Greek.) The leaves are alternate and odd-pinnate. The showy panicles of white flowers bloom in June, usually in alternate years, and the fruit ripens in late August and September. The pods contain four to six seeds. Optimum natural seedbed conditions are in rich, moist soils protected by partial vegetation or litter cover. Germination takes place in the spring following seed fall. The tree is moderately long-lived and growth is moderately rapid, and it is resistant to cold and fairly resistant to drought. Although the yellowwood is reportedly resistant to insects and diseases, the trees in Indiana and Illinois are not healthy. In Alexander County, Illinois mature trees are 6 to 17 inches in diameter, but often the trunks are dead or very rotten above 10 feet and have few live limbs. However, most of the trees have numerous basal sprouts, indicating that it may reproduce by this method.

HISTORY OF OCCURRENCE IN ILLINOIS

The yellowwood was first reported in Illinois in 1928, when a local resident of the Olive Branch-Tamms area of Alexander County, showed the trees along Wolf Creek to the State Forester. Since that time, all of the known reported collections have been from the original stand with the exception of one undocumented collection at the east end of the Shawneetown Hills in Gallatin County. The Gallatin County site has since been disturbed by timber cutting and clearing, and no yellowwoods were found there in the course of this study.

Old residents of the Olive Branch-Tamms area have reported that the yellowwood was once more numerous and grew large enough to be cut for timber. It was commonly called "yellow beech" by local residents.

Although it is not known how extensive the original stand might have been, it is doubtful if it has been drastically reduced. It was probably common along the slopes and valleys east of its present occurrence, in areas now cleared or heavily disturbed by timber cutting and grazing, but its apparent absence from many similar sites to the north, west, and south reflects the natural restriction of its range to a limited portion of the Ozark Hills. It is not known how extensive the Gallatin County stand might have been or to what degree it has been disturbed, as the report of a single tree is the only information known from that site.

Most of the general area of the present stand is owned by the U. S. Forest Service (acquired from 1934 to 1943), and has been protected from many disturbances such as clearing and livestock grazing since that time. It has still been subject to timber cutting (including one area of regeneration cut), timber stand improvement practices (in the area of the regeneration cut), tree planting, clearing for wildlife food plots, wildlife pond construction, and fire trail construction. These disturbances have not directly affected the yellowwood except for the regeneration cut and timber stand improvement practices.

Concern for the preservation of the yellowwood and the discovery in this area of the only known stand of the bigleaf snowbell bush in Illinois (Schwegman, 1968) led to the establishment of the Wolf Creek Botanical Area, a special zone of the Shawnee National Forest, in 1970. This area provides some degree of protection for about one-third of the known stand.

CHARACTER OF THE ALEXANDER COUNTY SITE

The area referred to as the Alexander County site, which includes all of the known yellowwood trees in Illinois, is an approximately 840 acre tract described as follows:

That part of the southeast quarter of Section 9 south of Wolf Creek; that part of Section 16 south of Forest Service Road 261 and west of County Road 943; that part of the west half of Section 17 south of Forest Service Road 261; and the north quarter of Section 21 west of County Road 943, all in Township 15 South, Range 2 West.

The Alexander County site is an area of narrow ridges, steep slopes, and deep ravines along the southeast edge of the Ozark Mills. The west part of the area drains northward into Wolf Creek by means of a deep ravine and steep slopes bordering the stream. The east part of the area drains to the east by means of several deep ravines into the bottom land. Wolf Creek and its bottom land borders the area on the north, and Road Run Creek is to the south of the site. The creeks and drainageways, joining with other streams in the bottom land, eventually enter Cache River at points $3\frac{1}{2}$ and 4 miles to the east and southeast of the upland. Wolf Creek flows most of the year, but may only be a series of small pools during the dry part of late summer and fall. It is a generally clear stream with a wide, gravelly and rocky bed and small deep holes. The ravines have rocky, boulder-strewn drainageways that are usually dry except during periods of rainfall, when they may become quite competent and deposit gravel over the narrow valley bottoms. Bailey Limestone of the Devonian System underlies the area, and cherty gravel and scattered boulders are often exposed along the steep slopes as well as in the drainageways. The soils are generally thin, especially along the steep, gravelly slopes, and are often quite rocky. Generally well-drained, cherty silt loams, formed in loess over chert bedrock, characterize the area. The area is practically all wooded with the exception of the valleys in the eastern part on private lands near the county blacktop road. The north end of the valley in the west part of the area was an old cleared field and is now planted in trees. There are several wildlife ponds and 1 to 2-acre wildlife food plots on ridgetops in the area. Forest Service fire trails follow the main ridgetops and along the valley bottom of the west ravine. Probably all of the area has been cut-over many years ago, and the hollow in the north part of Section 21 was clear-cut a few years ago leaving scattered large trees, especially beech, that have since been girdled as a timber stand improvement practice. There is a graveled county road at the base of the upland along the north part of the area that generally follows Wolf Creek.

The yellowwood in Alexander County is restricted to the north-facing slopes of the Wolf Creek valley and to hollows south of Wolf Creek, where it grows on north-facing slopes and in the narrow valley bottoms. On mesic north-facing slopes where it is

most common, such as in the southeast quarter of Section 17, beech is the dominant tree. Other common associates of the yellowwood on mesic north facing slopes include red oak, cucumber magnolia, bitternut hickory, sugar maple, white oak, pignut hickory, and tuliptree. This forest community is similar in composition to that of the Ogle Hollow stand in Indiana (Deam 1953; Lindsey, Schmelz, and Nichols 1969), and it is also similar to the stands in which yellowwood occurs described by Braun (1950, p. 52-56) in the all-deciduous mixed mesophytic forest of the Cumberland Mountains in eastern Kentucky. In ravine bottoms south of Wolf Creek some of the healthiest yellowwoods in the area grow near the banks of the intermittent streams or even on the banks. In this community, common associates of the yellowwood include sugar maple, bitternut hickory, and sugarberry. Yellowwood also occurs sparingly on upper slopes, nearly to the tops of the ridges, where it is associated with black oak, white oak, and pignut hickory; but mesophytic trees such as beech, cucumber magnolia, and sugar maple also grow in this same situation. The yellowwood can thrive in relatively dry sites, as is illustrated by the stand in which it attains its largest size and becomes a part of the canopy. This is a small gravelly, north-facing slope in the southernmost hollow in Section 16. On this slope are three of the largest yellowwoods in the area, with multiple trunks that average 10 inches in diameter, and with broad crowns with the same position in the canopy as the surrounding cucumber magnolias, beeches, and red oaks. The relative dryness of the site is indicated by such trees as white oak, pignut hickory, white ash, and red maple; such shrubs as hophornbeam and shadbush; and herbs such as stonemint, blue goldenrod, and hawkweed. Although yellowwood is restricted to north-facing slopes and sheltered ravine bottoms, it can occupy a rather wide range of habitats within these limits.

PRESERVATION VALUES

The yellowwood is rare or of local distribution generally throughout its range, and because of its scarcity and small size it is of little commercial value. Rather, it is of value to the forest ecologist and plant geographer. The yellowwood displays unusual characteristics in its distribution and ecology from which much has been learned and remains to be learned about the interaction of this species with its environment as well as about the history of the development of our forests.

The value of preserving the yellowwood has been recognized in Indiana and Illinois, which are the states in which it is rarest, but even in these states it has suffered from recent destruction. In Indiana the only stand of yellowwoods in Yellowwood State Forest may have been totally destroyed by timber-cutting in 1963 (Lindsey, Schmelz, and Nichols, 1969). However, in nearby Brown County State Park the last known stand of yellowwoods in Indiana (63 trees) has been dedicated as an Indiana Nature Preserve (Barnes, 1972). In Illinois the yellowwood was once

known from two locations, both of which have suffered from disturbance in recent years. The area in which the single tree was found in Gallatin County has been considerably disturbed by clearing since the discovery, and attempts to relocate the tree have been unsuccessful. Part of the stand outside the Wolf Creek Botanical Area in Alexander County was recently disturbed by clear-cutting and timber stand improvement practices. In Missouri the yellowwood occurs only on bluffs along the White River and its tributaries. Steyermark (1963) states, however, "Thousands of these handsome and rare trees have been exterminated from their original stations by dams created on various sections of the White River in the past ten years."

It becomes apparent that the yellowwoods in Alexander County merit special protection and study because of their scientific value. The study of relict populations or populations at the limits of a species' range often provides more information on its ecology than studying a species where it is abundant or at the center of its distribution. In relict situations environmental factors limiting or contributing to the success of the species can often be more readily determined and measured. The Alexander County stand is a truly relict population, and the only one known in Illinois. Only 78 trees are known, restricted to a few north-facing slopes and ravine bottoms. Even though seemingly suitable habitat, with forest associations similar to that in which the yellowwood grows occurs elsewhere in the Illinois Ozarks, the stand at Wolf Creek is restricted to a limited area. The trees are not healthy, and it is questionable whether the present stand reflects the original character before disturbance. Information concerning possible changes in the character of these trees is very limited, but the present condition of dead and dying trees with live sprouts around the stumps could be natural. There are certainly few large healthy trees in the present stand, and none were noted that would be cut for saw timber. Scientific study of the yellowwood in Alexander County would provide information valuable to the understanding of the ecology of the species as a whole, as well as useful in the management and protection of the Illinois stand.

RECOMMENDATIONS

This study supports the assumption that the yellowwood is a rare tree in Illinois with a very limited range. It also reveals a poor (possibly unnatural) condition of the stand with many dead or dying trees and few seedlings. Thus, the yellowwood should be considered an endangered plant species in Illinois.

Although some provisions have been made for the protection of the tree by the establishment of the Wolf Creek Botanical Area, there should be even more concern by the U. S. Forest Service for the preservation of the only known stand of yellowwoods in the state. Each group of trees (shown on maps, Fig. 3 and 4) should be noted on all Forest Service management plans and maps for the

area, and the sites protected from disturbance. Management by Forest Service personnel in the vicinity of the stand should be conducted by foresters who are familiar with the yellowwood, and would recognize any new locations for the tree. Management of the site might include: marking the boundaries of each group of trees, protecting the sites and watersheds of each group from any unnatural disturbances, either by management personnel or visitors, and conducting or encouraging active study of the stand to determine the natural condition and present status of the species.

As this is one of the rarest trees in Illinois, and is an endangered species, even stronger measures of protection than Botanical Area status might be necessary for adequate preservation of the known stand. The value of the area, not only to plant geographers, but also to forest ecologists, justifies special protective status within the land classification system of the U. S. Forest Service.

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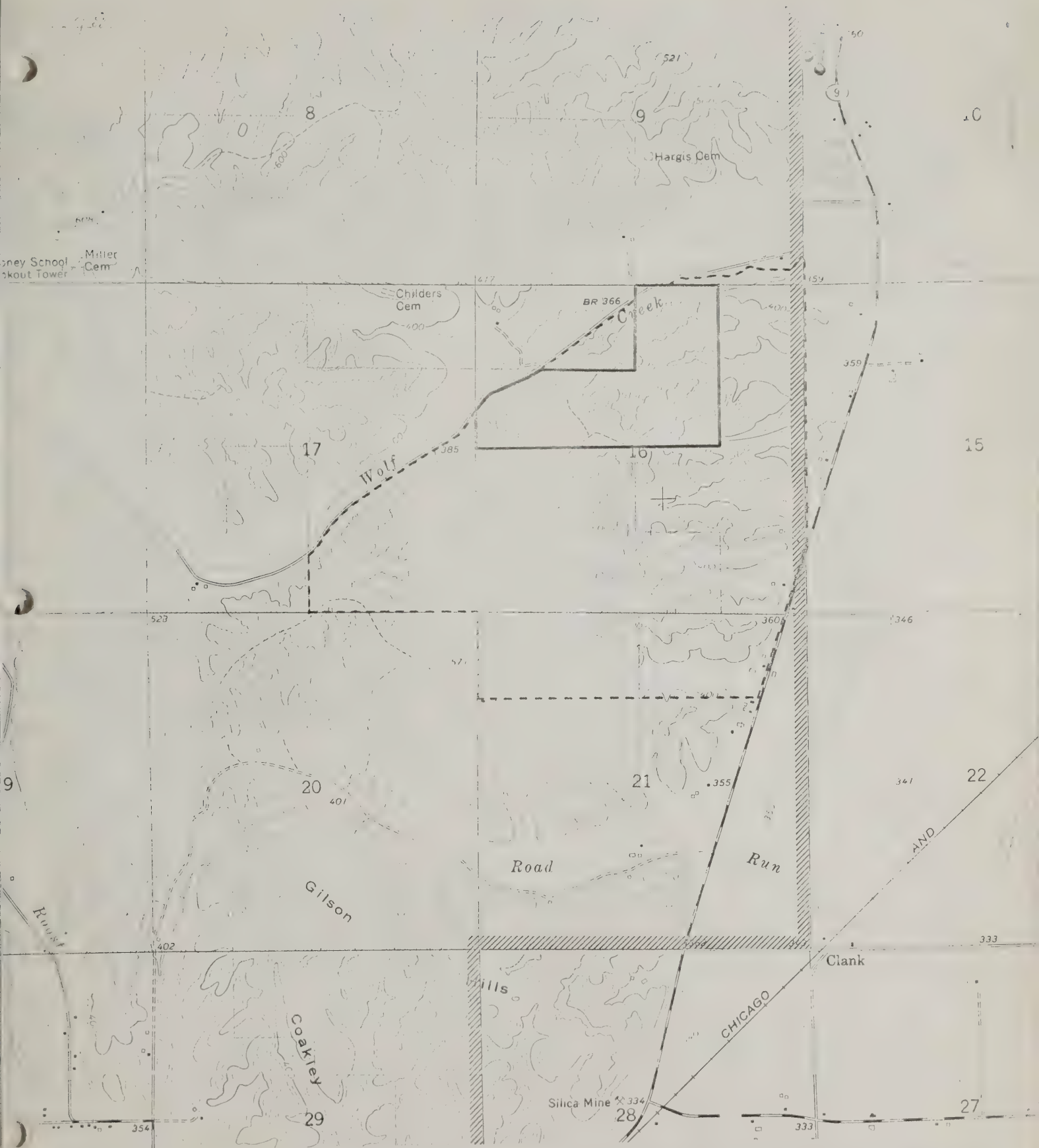


Figure 1. Topographic map showing location of yellowwood stand in Alexander County (dashed line), location of U. S. Forest Service Wolf Creek Botanical Area (solid line), and U. S. Forest Service ownership (shaded), Township 15 South, Range 2 West

Scale 1:24000

SOILS LEGEND

- 214E2 - Hosmer silt loam, 12 to 18 percent slopes, eroded; moderately well drained soils with a fragipan, formed in thick loess underlain by gravel, sand, or clay
- 214E3 - Hosmer silt loam, 12 to 18 percent slopes, severely eroded
- 216F - Stookey silt loam, 18 to 30 percent slopes; well drained soils, formed in loess overlying chert bedrock
- 308D - Alford silt loam, 7 to 12 percent slopes; well drained soils, formed in loess overlying massive chert beds
- 308E3 - Alford soils, 12 to 18 percent slopes, severely eroded
- 308F - Alford silt loam, 18 to 30 percent slopes
- 308F2 - Alford silt loam, 18 to 30 percent slopes, eroded
- 308F3 - Alford silt loam, 18 to 30 percent slopes, severely eroded
- 331 - Haymond silt loam; well drained soils, formed in silt loam sediments derived from loess on nearby uplands
- 333 - Wakeland silt loam; somewhat poorly drained soils, formed in silt loam sediments derived from loess on nearby uplands
- 382 - Belknap silt loam; somewhat poorly drained soils, formed in acid silt loam sediments derived from loess on nearby uplands
- 453E2 - Muren silt loam, 12 to 18 percent slopes, eroded; moderately well drained soils, formed in loess
- 453F3 - Muren silt loam, 18 to 30 percent slopes, severely eroded
- 471G - Bodine cherty silt loam, 30 to 60 percent slopes; somewhat excessively drained soils, formed in loess over chert bedrock
- 475 - Elsay silt loam; moderately well drained soils, formed in silt loam sediments derived from surrounding loess-covered uplands
- 990G - Stookey-Bodine complex, 30 to 60 percent slopes

Illinois Nature
Preserves Commission
September 12, 1973
John White

NATURE PRESERVE POTENTIAL OF THE BURTON CAVE AREA
ADAMS COUNTY, ILLINOIS

Section 19, T. 2 S., R. 7 W. of the 4th P.M.

78 acres

SUMMARY AND RECOMMENDATIONS

Burton Cave is a medium-sized limestone cave on Burton Creek in Adams County, in the Glaciated Section of the Middle Mississippi Border Division. The cave has been heavily vandalized, but is receiving protection from the Illinois Chapter of The Nature Conservancy, which owns 78 acres including the cave. Natural land on the area includes mesic and dry woodland on slopes, in ravines, and along the creek. Burton Cave, the natural land around it, and suitable buffer areas should be dedicated as an Illinois Nature Preserve.

1. INTRODUCTION AND DESCRIPTION

A. Location (Figure 1)

Burton Cave is in Adams County, in west-central Illinois. It is 8 miles east of, and 3 miles south of the center of Quincy; or one mile south of Burton. The area is on the Quincy, Ill.-Mo. and Liberty, Ill. 15 minute topographic quadrangles.

Legal description

The land is described as follows: All that part of the west seven-eighths of the north half of the northeast quarter of section 19 lying east of Burton Creek and west of the Dry Branch of said Burton Creek, containing 20 acres, more or less; also the west 60 acres of the south half of said northeast quarter of section 19 except 2 acres, more or less, off the northwest corner of said 60 acres and being on the west side of said Burton Creek with the center line

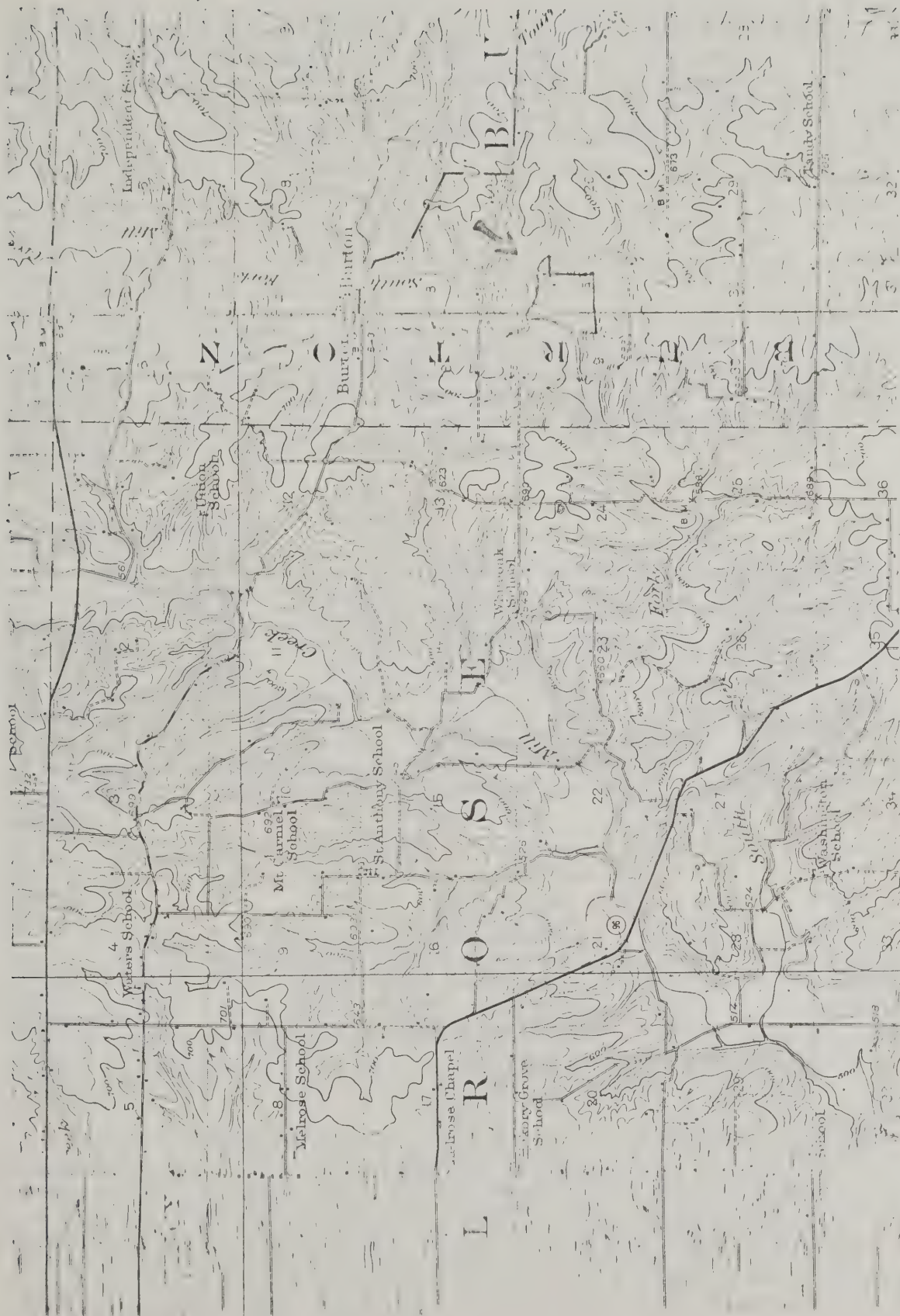


Fig. 1. Location and topographic map -- Burton Cave Area, Adams Co., Ill.
Quincy and Liberty 15 minute quadrangles.

of said Burton Creek being the east line of said 2 acres; all in Township 2 South of the base line in Range 7 West of the 4th Principal Meridian in Adams County, Illinois.

The land is owned by the Illinois Chapter of The Nature Conservancy.

B. Character of the area

Regional relationships

Burton Cave is in Adams County, which borders the Mississippi River. The county is predominantly rural; two-thirds of the population of about 70,000 lives in Quincy, the county seat. Siloam Springs State Park is 16 miles east of Burton Cave; Macomb is 50 miles to the northeast; and Springfield is 90 miles to the east.

General character

Burton Cave is in the Glaciated Section of the Middle Mississippi Border Division, which consists of rugged, well-dissected terrain along the Mississippi River. The cave is in the Mill Creek watershed, which extends from the Mississippi River bottomland at the altitude of 500 feet above sea level to an undissected plain at the altitude of 770 feet, a few miles east of the cave. The land is hilly, and 100 feet of relief per mile is common. The region was formerly predominantly forested, although much of the land has been cleared for farming, and woodland is now mostly restricted to the steepest slopes.

Geology

The bedrock is Burlington Limestone (Mississippian), which at Burton Cave is relatively thinly-bedded and contains thick, continuous chert beds. The area was covered by Kansan glaciation; the drift is named the Banner Formation. The region is also mantled by loess, but the loess and drift are severely eroded on the slopes around Burton Cave, so that bedrock crops out and forms cliffs above the streams.

Burton Cave is at the confluence of Dry Branch with Burton Creek (also called the South Fork of Mill Creek, or simply Mill Creek). The valley of Dry Branch enters the valley of Burton Creek at an obtuse angle, resulting in an unusual narrow promontory, bounded on the west by Burton Creek, which flows southeastward, and on the east by Dry Branch, which flows northwestward. The streams flow directly at the base of the promontory and are bedded by broken and

weathered limestone. Burton Cave opens on Burton Creek and extends eastward toward Dry Branch.

South of the 70-foot-high promontory containing Burton Cave, the upland is nearly level, with three small ravines, and gradually rises to 100 feet above Burton Creek.

Soils

The soil on the level upland in the south part of the area is yellow-gray silt loam, and on the slopes and in the ravines is a yellow silt loam. These silt loams are relatively infertile, readily erodible forest soils. Soil is thin or absent along Burton Creek and Dry Branch where bedrock crops out. The soil of the stream bottoms is a mixed loam of alluvial origin.

Vegetation

Natural vegetation, which is woodland, is restricted to the bottomland, steep slopes, and ravines along the streams. The driest sites have a forest of white oak (Quercus alba), black oak (Quercus velutina), red oak (Quercus rubra), and pignut hickory (Carya glabra). Characteristic trees of the steep, rocky limestone slopes include red oak, hophornbeam (Ostrya virginiana), chinkapin oak (Quercus muehlenbergii), and sugar maple (Acer saccharum). Prairie plants such as pale coneflower (Echinacea pallida), prairie clover (Petalostemum), little bluestem (Andropogon scoparius), goat's rue (Tephrosia virginiana), and leadplant (Amorpha canescens) grow in the dry woods and on the rocky slopes. In the mesic ravines may be found basswood (Tilia americana), sugar maple, musclewood (Carpinus caroliniana), bladdernut (Staphylea trifolia), hepatica (Hepatica acutiloba), and ginseng (Panax quinquefolia). In the bottomland at the confluence of Dry Branch with Burton Creek, common plant species include cottonwood (Populus deltoides), silver maple (Acer saccharinum), box elder (Acer negundo), black walnut (Juglans nigra), spicebush (Lindera benzoin), bladdernut, poison ivy (Rhus radicans), stinging nettle (Urtica dioica), and jewelweed (Impatiens). Dry Branch is bordered by a thin strip of timber, including sycamore (Platanus occidentalis), river birch (Betula nigra), black walnut, red oak, shellbark hickory (Carya laciniosa), cottonwood, and American elm (Ulmus americana, many of which are dead). The broad, rocky streambed of Burton Creek provides habitat for willows (Salix spp.) and water-willow (Dianthera americana).

The rest of the Nature Conservancy land is former farmland, consisting of fallow fields of goldenrod (Solidago) and other herbs, pine plantations, and thickets. Multiflora rose (Rosa multiflora) hedges border many of the fields and pine plantations.

Liang (1970) isolated 92 species of microfungi from the soil in Burton Cave, including 1 phycomycete (algal fungus), 3 ascomycetes (sac fungi), and 88 fungi imperfecti (imperfect fungi). Most commonly isolated were Penicillium notatum, Penicillium tardum, and Aspergillus sydowi. In terms of percentage frequency of occurrence, the major fungal genera were Penicillium, Aspergillus, and Trichoderma.

Fauna

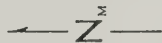
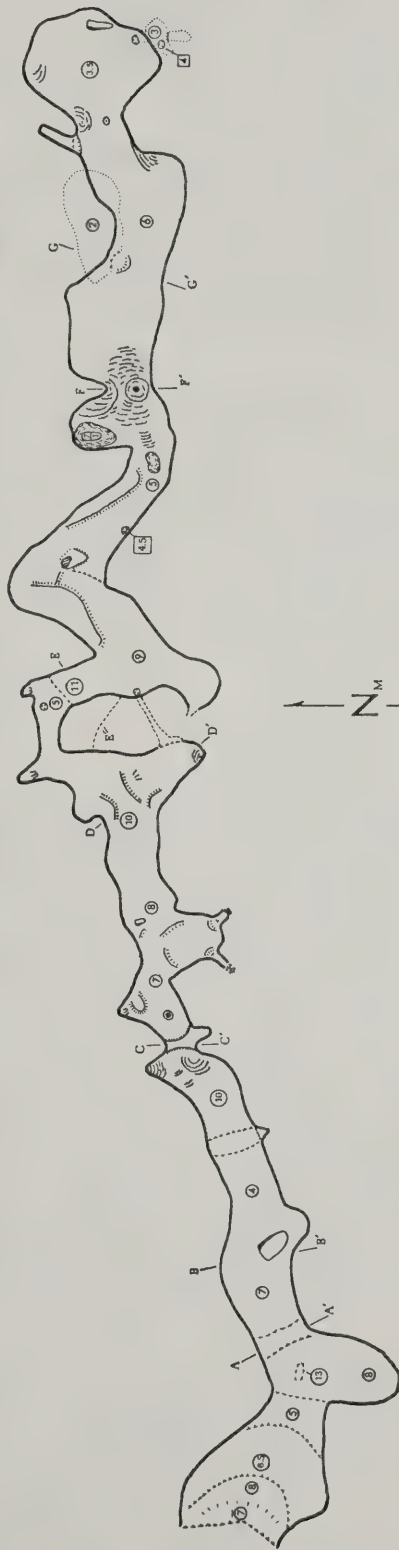
Many of the common vertebrates of the region are known from the Burton Cave area. The streams support a permanent fish population and provide breeding habitat for a number of amphibians. Typical birds of the fields include the field sparrow, goldfinch, and indigo bunting. Rufous-sided towhees, catbirds, cardinals, and mourning doves frequent the thickets. The long-eared owl and barred owl have been observed on the area. The mammals include the common mole, cottontail, raccoon, and white-tailed deer.

Skaggs (1973) studied the bats in Burton Cave from September 1969 to May 1972. In 17 visits he found 55 individuals, of the following four species: little brown bat, gray bat, eastern pipistrelle, and Keen's bat.

The invertebrate fauna of Burton Cave has been the object of study by a number of biospeleologists. Among the most interesting records are that of the blind amphipod (a crustacean) Apocrangonyx subtilis; and an undescribed species of Metriocampa, which is a dipteran (an insect), probably troglobitic (restricted to living in caves), known only from a few localities in Illinois and one locality in eastern Missouri.

C. Burton Cave (Figure 2)

The arched entrance of Burton Cave, in a recess in the bluff about 50 feet above Burton Creek, is 7 feet high and 30 feet wide. The entrance area has been modified by roof collapse, so that the floor, which is in part a talus of ceiling slabs, gradually descends and is roughly paralleled by the sloping ceiling. Abrupt changes in ceiling height caused by collapse of cherty beds in the roof are evident in the entrance as well as throughout the cave; chert ledges projecting from the walls are also a distinctive feature of the cave. Burton Cave, which consists of one passage with few lateral widenings, is about 620 feet long and nearly straight, so that the end of the cave is slightly over 500 feet east of, and 50 feet north of the entrance. The passage averages 20 to 30 feet wide and 7 to 10 feet high, but is as much as 45 feet wide, and the ceiling locally rises to 13 feet. There are remnants of a residual clay fill on ledges



Transverse Longitudinal Section



Surveyed June 1973
by J. White & D. Coons

Ceiling heights in feet
Depth of clay fill undetermined

BURTON CAVE ADAMS CO., ILL. Illinois Speleological Survey AD 0001

Figure 2. Burton Cave, Adams Co., Ill.

and in recesses in the cave, and the bedrock floor of the cave is obscured by a clayey and silty fill of undetermined depth. At intervals there are sumps, or depressions where the fill is being removed downward, and although the cave is basically on one level, there are two lower lateral extensions large enough to enter. The cave terminates in a breakdown and silt fill at the wall of the Dry Branch valley.

There is no stream in Burton Cave, but there are areas where water descends vertically along the walls or drips from the ceiling to collect in pools or to seep through the fill. These are areas of active deposition of flowstone and dripstone; there are flowstone mounds and cascades, large stalagmites, a large column, and many stalactites, or at least their broken stubs.

The cave formed by solution of the Burlington Limestone by groundwater before the valleys of Burton Creek and Dry Branch developed. The cave has no relation to the present topography except that downcutting by Burton Creek intersected the cave and opened an entrance, and similarly, erosion by Dry Branch truncated the cave passage and blocked it with hillside debris. Bretz and Harris (1961) present a theory about the development of Burton Cave in relation to the ancient Lancaster peneplain.

D. History of area

No evidence is known of aboriginal occupation of Burton Cave or the surrounding area, although it is likely that Indians used the area. Since its discovery by white man, reportedly about 1848, the cave has been a popular retreat for local residents and Quincyans. The property was formerly farmed, and an unused farmstead remains on the south part of the area. The relatively level areas have been cleared and cultivated, and the wooded slopes have been grazed. The Irwin family owned the area for many years; later it was acquired by the Quincy Foundation and made available for Boy Scouts. There once was a two story cabin suitable for twenty Scouts above the cave. The Boy Scouts lost interest in the area, and the Quincy Foundation gave the area to The Nature Conservancy to be preserved in a natural state as much as possible and to be used for scientific and educational purposes. The Nature Conservancy wishes to lease the area to Western Illinois University, and then to dedicate it as an Illinois Nature Preserve.

The Burton Cave area has long been visited by scientists and naturalists, including Mr. T. E. Musselman, Reverend Robert Brinker, personnel from the Illinois Natural History Survey and Illinois State Geological Survey, and others allied with various other organizations. Western Illinois University has taken an active interest in scientific and educational use of the cave and in monitoring the life of the cave. A study of the soil microfungi and a comparative study of the bats of

Burton Cave and three other caverns have culminated in master's theses for two Western Illinois University students.

II. AREA RESOURCES AND VALUES

A. Nature preserve values

Uniqueness or rarity of natural types

A cave is a relatively unique geological and biological phenomenon: it is the product of a unique combination of physical factors and processes, which results in an unusual natural environment. Burton Cave is not particularly unique among caves, for it does not display any especially outstanding or unique features. The formation in Burton Cave described by Bretz and Harris (1961) as the largest stalagmite known to them in the state is actually a column, not a stalagmite, and there are stalagmites and columns in other Illinois caves larger than this one. However, the origin and history of development of every cave is different, and Burton Cave exhibits geological features in a degree of expression and combination different from any other cave.

The surface features of the Burton Cave area are not unique, but rather are representative of the natural types of the region.

Diversity of natural types

Geologically Burton Cave is not diverse; nor are the biological habitats particularly diverse for a cave. However, Burton Cave provides a number of environments that would not otherwise exist on the area.

Because the natural land on the Burton Cave area is restricted to the slopes and narrow bottomland along Burton Creek and Dry Branch, as well as to the streams themselves, the diversity of natural types is limited. However, there are elements of both prairie and mesic ravine floras, and there is a striking contrast between the moist, northeast-facing slopes above Dry Branch and the dry, southwest-facing cliffs above Burton Creek. The former cropland on the area provides a number of habitats, such as abandoned fields, thickets, multiflora rose hedges, pine plantations, and a small pond, but these are not natural.

Rare species

Burton Cave is one of the few caves in Illinois where the

gray bat has been found, and the Keen's bat, which is not commonly collected in Illinois, has been found in the cave. Some of the cave invertebrates are also unusual.

The rock elm (Ulmus serotina) is reported at its southernmost station in Illinois at Burton Cave.

Naturalness and lack of disturbance

Burton Cave is heavily disturbed from both intentional vandalism and the wear of heavy visitation. Hundreds of stalactites have been broken; fossils have been chipped from the walls; chert ledges and nodules have been smashed; names and dates have been scratched and painted on the walls; poisonous residue from carbide lamps has been dumped on the floor; and trash litters the bottom of the pools. There is charred wood, discarded clothing, and garbage from campfires and picnics in the cave. At times in the past the cave was constantly filled with smoke from the fires, and soot blackens the walls and ceiling. The fires and disturbance from people are the probable cause for the severe decline in the bat population in the cave. The floor is hard packed; dripstone and flowstone has been carelessly muddied, trampled, and broken; every corner and hole in the cave has been explored; and the residual unctuous red clay on ledges and in pockets has been fingered by the curious. So thoroughly has the cave been explored and probed that there are few places where the sediments, which are so important to interpreting the history of the cave, remain intact. Uncontrolled visitation to the cave is being discouraged, so that vandalism has decreased; and there have been attempts to remove some of the trash, so the natural environment of the cave is improving.

By the 1930's the Burton Cave tract had been nearly completely cleared of trees except on the steepest slopes and along the streams, and the woodland that remained was grazed. Trees were allowed to gradually invade the pastureland and the cultivated land as erosion became too severe. For this reason there is no definite boundary between the original woodland and that which has re-occupied cleared land. The original woodland has been logged, but there probably has been little such disturbance of the woods on the limestone bluff above Burton Creek. Boy Scouts must have had a locally severe impact on the area around the cave, but evidences of such disturbance are disappearing because of natural revegetation.

Replication of existing preserves

If the Mississippi River Sand Hills Nature Preserve, on the Mississippi River bluffs in Hancock County 35 miles north of Burton Cave, is placed in the Illinois River and Mississippi River Sand Areas Division, then there is no Illinois Nature

Preserve in the Middle Mississippi Border Division. Several areas in this Division have been considered for acquisition or dedication as nature preserves, including: Loud Thunder Forest Preserve (Rock Island Co.), Cedar Glen Eagle Roost (Hancock Co.), Cap au Gres (Calhoun Co.), and Pere Marquette State Park (Jersey Co.).

Dedication as an Illinois Nature Preserve has been approved in principle for Twin Culvert Cave in Pike County. This cave is in the Driftless Section of the Middle Mississippi Border Division, instead of the Glaciated Section, in which Burton Cave lies. Burton Cave is the result of developmental processes markedly different from those that formed Twin Culvert Cave.

Scientific and educational value and use

Western Illinois University plans to lease the Nature Conservancy land at Burton Cave and to use it for field trips, classes, and research. Already two studies for master's theses by WIU students that used the cave have been completed. One study compared the bat population of Burton Cave with the bats in some other caverns, and the other study was of soil microfungi in the cave.

Public enjoyment

The cave, the surrounding wooded hill, and wide, rocky Burton Creek are natural attractions for the public. The cave has long been a place to visit and explore, and people continue to trespass to visit it.

B. Land condition classification (Figure 3)

<u>Land condition</u>	<u>Acres</u>	<u>Percent</u>
Old woodland	13.3	17
Young woodland and thickets	31.2	40
Pine plantations	5.5	7
Fallow fields	28.0	36
Total	78.0	100

Old woodland includes forest that has never been cleared, but has been logged and grazed.

Young woodland and thickets are areas of invasion of trees and shrubs onto formerly cleared land.

Pine plantations are 15 to 20 years old.

Fallow fields are cropland and pastureland that have not been cultivated or mowed in recent years.

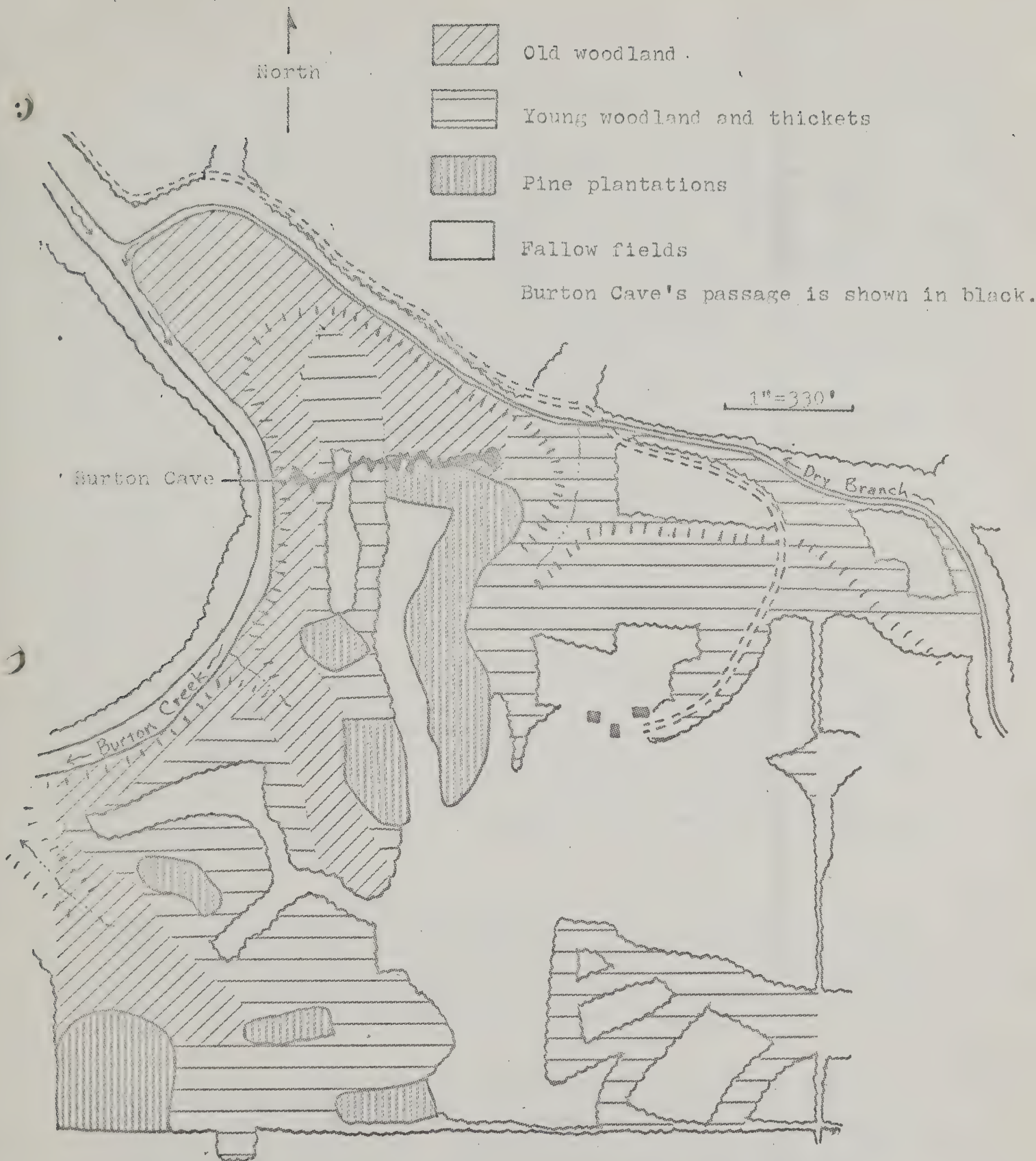


Figure 3. Land condition classification map -- Burton Cave Area, Adams County, Illinois.

III. MANAGEMENT

Managing the area as a nature preserve would involve many problems with people and the cave. Although the access road to the Nature Conservancy land is gated and the land is posted against trespass, groups visit the cave nearly every week. Continued uncontrolled use by visitors, many of which are ignorant of basic cave conservation practices, continues to damage the natural quality of the cave. Most of the delicate features of the cave have already been damaged, so further abuse will probably be mostly discarding of trash, painting of walls, and further damage to features already partly ruined. Only continuous supervision of the cave would keep vandalism to a minimum. Gating would be practical at a constriction about 200 feet inside the cave, but experiences at other caves have shown that sooner or later cave gates are smashed. Abuse of the cave such as campfires has lessened, and the future might lead to the return of large numbers of bats. Monitoring the changes in the life of the cave as the environment continues to be protected might be an integral part of managing the area.

Burton Cave is easily traversed, with a minimum of climbing and crawling, but there are areas of slippery wet rocks and mud that require caution. There should rarely be instances of explorers becoming lost unless they lose their sources of light.

Since The Nature Conservancy owns the entire cave and there are no streams in the cave, it is relatively protected from surrounding influences. Burton Cave cannot be considered completely isolated from the outside, though. Above the cave are a fallow field, a multiflora rose hedge, thickets, and the edge of a pine plantation. Such unnatural land transformation above the cave might influence the cave in unexpected ways: for example, water seeping from the pine plantation into the cave might be unnaturally acid and may be redissolving flowstone that it once deposited.

There are several large walnuts along Dry Branch which might be stolen because the area is isolated and Dry Branch is bordered by a road. Also, there are several cottonwoods that are 2 to 4 feet in diameter and up to 50 feet to the first limb that would make good saw-logs. The neighboring farmer generally checks to find out what visitors to the area are doing, so timber theft might be relatively difficult.

If part of the area is dedicated as an Illinois Nature Preserve, it should include the ridge with the cave, the natural woodland and ravines bordering Burton Creek, and buffers to protect the natural area. The buffers would necessarily include abandoned fields, pine plantations, and some impenetrable multiflora rose hedges. Part of the Nature Conservancy land, including the fields in the southeast part of the area, might best be used for purposes other than a dedicated nature preserve,

such as a prairie restoration project and access and maintenance facilities.

CONCLUSION

The Burton Cave area should be included in the Illinois Nature Preserves System. The cave has been heavily vandalized, and protecting and restoring the natural quality of the cave, and controlling visitor use will continue to be problems. However, the adverse factors in managing the area are countered by a number of values, including: 1) its scientific and educational value and use, 2) the habitat for a rare species of bat, and 3) the fact that Burton Cave is a significant cave that is being protected and is available for permanent preservation.

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- Skaggs, D. M. 1973. Occurrence of vespertilionid bats in some natural and man-made caverns of west-central Illinois. Unpub. M. S. thesis. Western Illinois Univ., Macomb. 53 p.

County Adams	Area Burton Cave		
Section 19	Township 2 South	Range 7 West	P.M. 4th
Date June 9, 1973	John White		

Rating					
Excellent +3	Good +2	Fair +1	Neutral or Nil 0	Poor -1	Very Poor -2
	X				
	X	X			
				X	
X			X		
	X				
	X				
		X			
		X			
		X			
	X				
			X		
			X		
	X				
	X				
				X	
	X			X	
			X		
X				X	
X					X
X	X				
3	9	4	4	4	1
12	36	16	16	16	4
9	18	4	0	-4	-2

Value and use as a nature preserve (high-low)

Nature preserve value

Natural character

- 1 Uniqueness or rarity of natural types
- 2 Diversity of natural types
- 3 Rare species
- 4 Naturalness and lack of disturbance
- 5 Wilderness character
- 6 Replication of existing preserves (no-yes)
- 7 Scientific value and use
- 8 Educational value and use
- Public enjoyment
- 9 Nature observation
- 10 Scenic and esthetic attraction
- 11 Expected visitation and tourism
- 12 Accessibility to large population
- 13 Expansion and diversification potential
- 14 Adjacent to public holding or nature preserve

Management and protection

Vulnerability (low-high)

To surrounding influences

- 15 Topographic and hydrologic
16 Population pressure and urbanization
17 Attractive nuisances
18 Potential hazards and nuisances to people
19 To public works projects

Management problems (no-yes)

- 20 Land
21 Visitors
22 Possible custodial arrangements (good-poor)

Dedication Factors

- | | | |
|----|--------------------------|------------|
| 23 | Threat of destruction | (high-low) |
| 24 | Availability | (high-low) |
| 25 | Alternate beneficial use | (low-high) |

Total checks

Percentage profile (total checks x 4)

Score (total checks x rating)

Total rating (max. +90, min. -60)

25

Illinois Nature
Preserves Commission
July 16, 1973
John White

INVENTORY OF
NATURAL AREAS

NAME: Lost Creek Marsh, Clinton County, Illinois

SIZE: Approximately 200 acres of marsh and 150 acres of wet woods

LOCATION: The center of the marsh is 1 mile southeast of Posey, or 5-1/2 miles south of, and 2 miles east of Carlyle. The marsh is on both sides of Lost Creek, a southwestward-flowing tributary of Crooked Creek, in the Kaskaskia River watershed. It is mostly south of Illinois Route 161, and is in sections 9, 16, 17, and 20, T. 1 N., R. 2 W. (Carlyle, Ill. 7.5 minute topographic quadrangle) (Figure 1)

OWNERSHIP: The marsh and surrounding wet woods are in eleven private ownerships, and the majority of the marsh is in two ownerships. (Figure 2)

INPC FRAMEWORK: Floodplain marsh and forest of the Effingham Plain Section of the Southern Till Plain Division.

VEGETATION: The marsh is mainly cordgrass (Spartina pectinata), with a large sedge (Carex sp.) a common associate. A smartweed (Polygonum sp.), a dock (Rumex sp.), marsh mallow (Hibiscus moscheutos), and colonies of cattail (Typha latifolia), and bulrushes (Scirpus spp.) are also common in the marsh. The marsh is bordered by buttonbush (Cephalanthus occidentalis), black willow (Salix nigra), and deciduous holly (Ilex decidua). There are scattered large black willows and young stands of black willow and silver maple (Acer saccharinum) in parts of the marsh.

The floodplain woods is generally dominated by silver maple; and locally dominated by pin oak (Quercus palustris) and ashes (Fraxinus pennsylvanica var. subintegerrima and F. tomentosa), particularly in the wettest areas. Other common trees are American elm (Ulmus americana), box elder (Acer negundo), and swamp white oak (Quercus bicolor). The banks of Lost Creek where it flows through the marsh have silver maple, American elm, and box elder, and much open ground with wild rye (Elymus virginicus) and a sedge (Carex sp.). Deciduous holly, up to 7 inches in diameter at breast

height (d.b.h.) (much larger than any on record for the species), grows in large clumps between the creek and the marsh.

The uplands bordering the marsh and wet woods are mostly dry second-growth oak - hickory, with such species as post oak (Quercus stellata), mockernut hickory (Carya cordiformis), shingle oak (Quercus imbricaria), and shag-bark hickory (Carya ovata).

FAUNA: Beavers are quite active along Lost Creek, particularly near the marsh. A rabbit and signs of squirrels and small mammals have been seen. The red-tailed hawk, great horned owl, bobwhite quail, common crow, cardinal, fox sparrow, chickadee, downy woodpecker, and red-headed woodpecker have also been seen in or around the marsh in winter. A brief visit in summer revealed redwings, a great blue heron, a green heron, and an American egret.

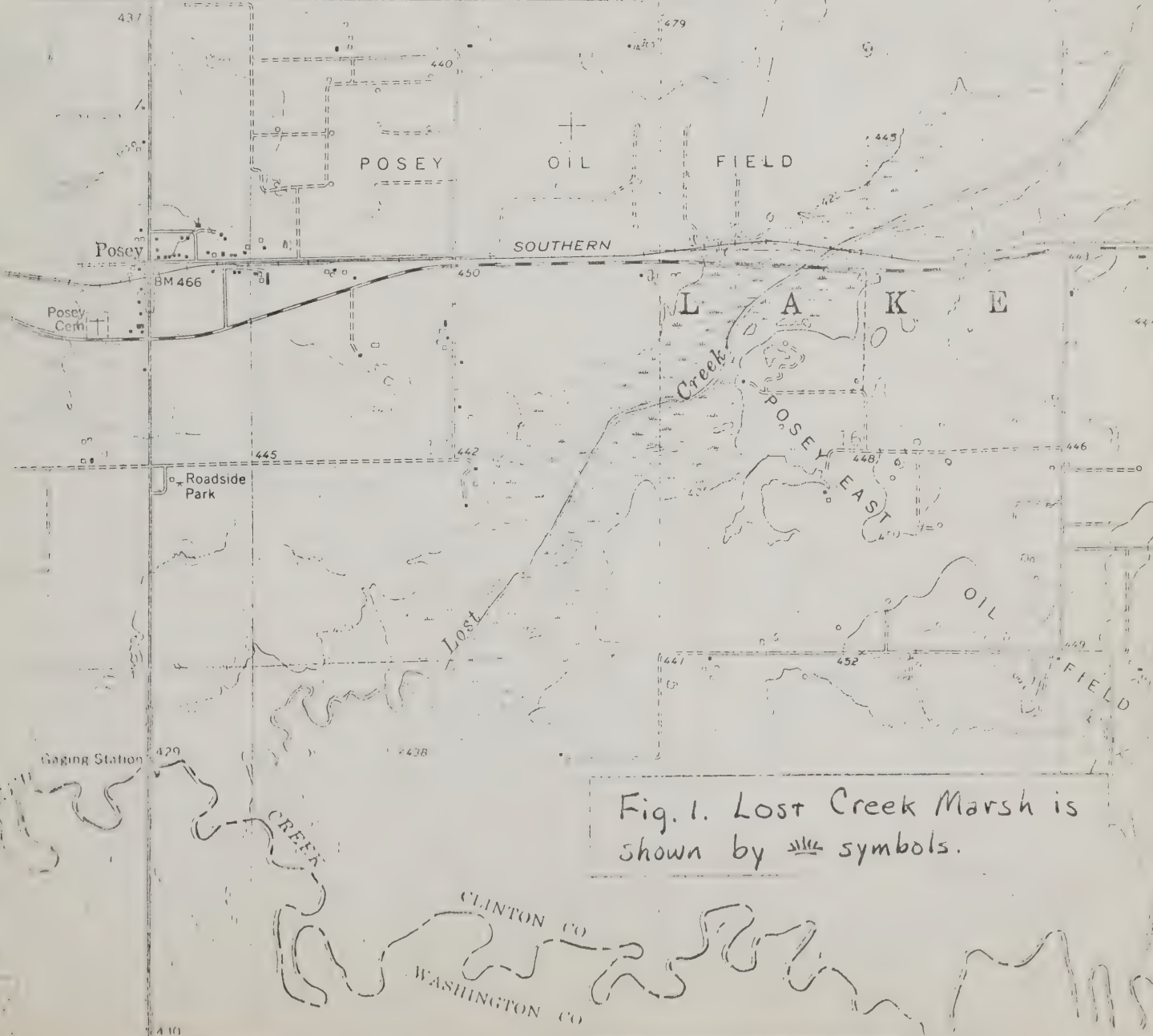
GEOLOGY, TOPOGRAPHY, & SOILS: The bottomland is flat and poorly drained alluvium of glacial and more-recent origin, and the upland is a level Illinoian glacial till plain, mantled by loess and with scattered drift ridges. Lost Creek Marsh and the surrounding bottomland woods are underlain by Bonnie silt loam, and the slopes bordering the floodplain are Bluford silt loam and a small area of Ava silt loam.

AQUATIC ENVIRONMENTS: Lost Creek is a perennial stream. The floodplain is poorly drained, and the wettest areas are marshes. There are small areas of naturally open water in the marshes, and open water in some artificial ditches and excavations.

SPECIAL FEATURES: The area is of high natural quality; the extensive marsh and wet woods are of particular interest, and viewing the marsh from Lost Creek gives one the impression of being along a primeval prairie stream. A check of aerial photographs and a helicopter survey indicate that this is probably the largest marsh in the Kaskaskia River watershed. The formerly extensive prairies in the Sante Fe Bottoms directly west of Lost Creek have been drained and destroyed, and the marshes of the vast Boulder Bottoms, directly to the north, have been destroyed by Carlyle Reservoir.

USE AND DISTURBANCES: There are a few small ditches, levees, and excavations in the marsh. The ditches and levees are old and seemingly ineffective in controlling the water level, and the excavations may be to create open water to attract waterfowl for hunting. Much of the floodplain woods is young (4 to 8 inches d.b.h.) and apparently has been

heavily cut or cleared, but parts of this community, especially along the east edge of the marsh, has pin oaks 1 to 2-1/2 feet d.b.h. The pin oak woods south of the marsh was cut in 1972, leaving 1-1/2 to 2 foot diameter stumps. Lost Creek has ^{been} channelized upstream from the marsh and probably through the marsh. The 1910 topographic map of the area shows a dashed line for Lost Creek through the marsh, but there is a definite channel for the creek now. The 1910 map also shows two roads crossing the marsh, which are not evident today. The 1938 and 1952 aerial photos show faint lines in parts of the marsh which may have been ditches or furrows. Part of the marsh appears to have been plowed in 1955 during an especially dry period. The marsh is used by hunters, but this use is discouraged by some of the owners, who wish to preserve the marsh as a place for wild animals.



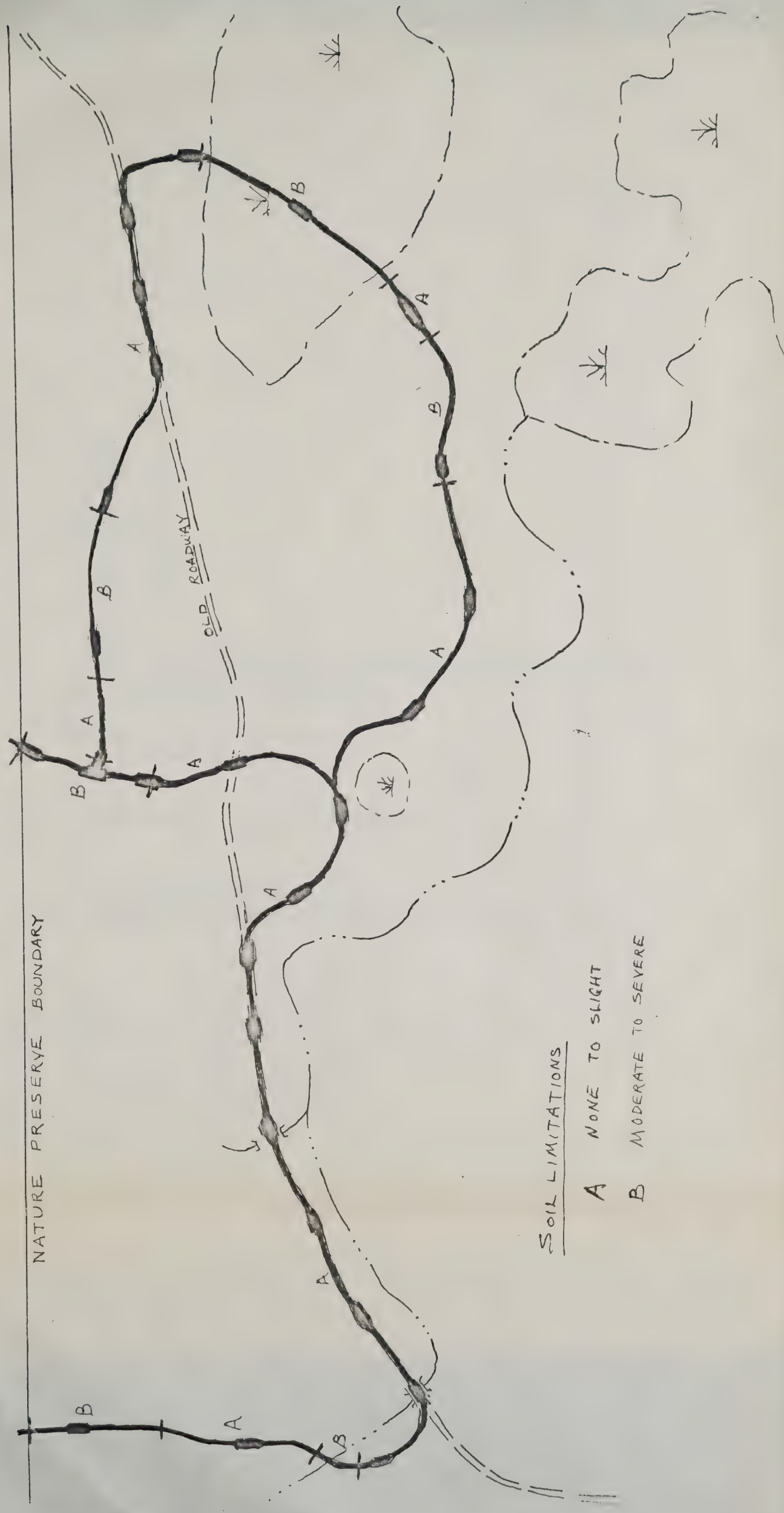
W. SE. 1/4 - 1/4 - 1/4

TRAIL PLAN

9/8/73

GB7 draft

SCALE 1" = 200'

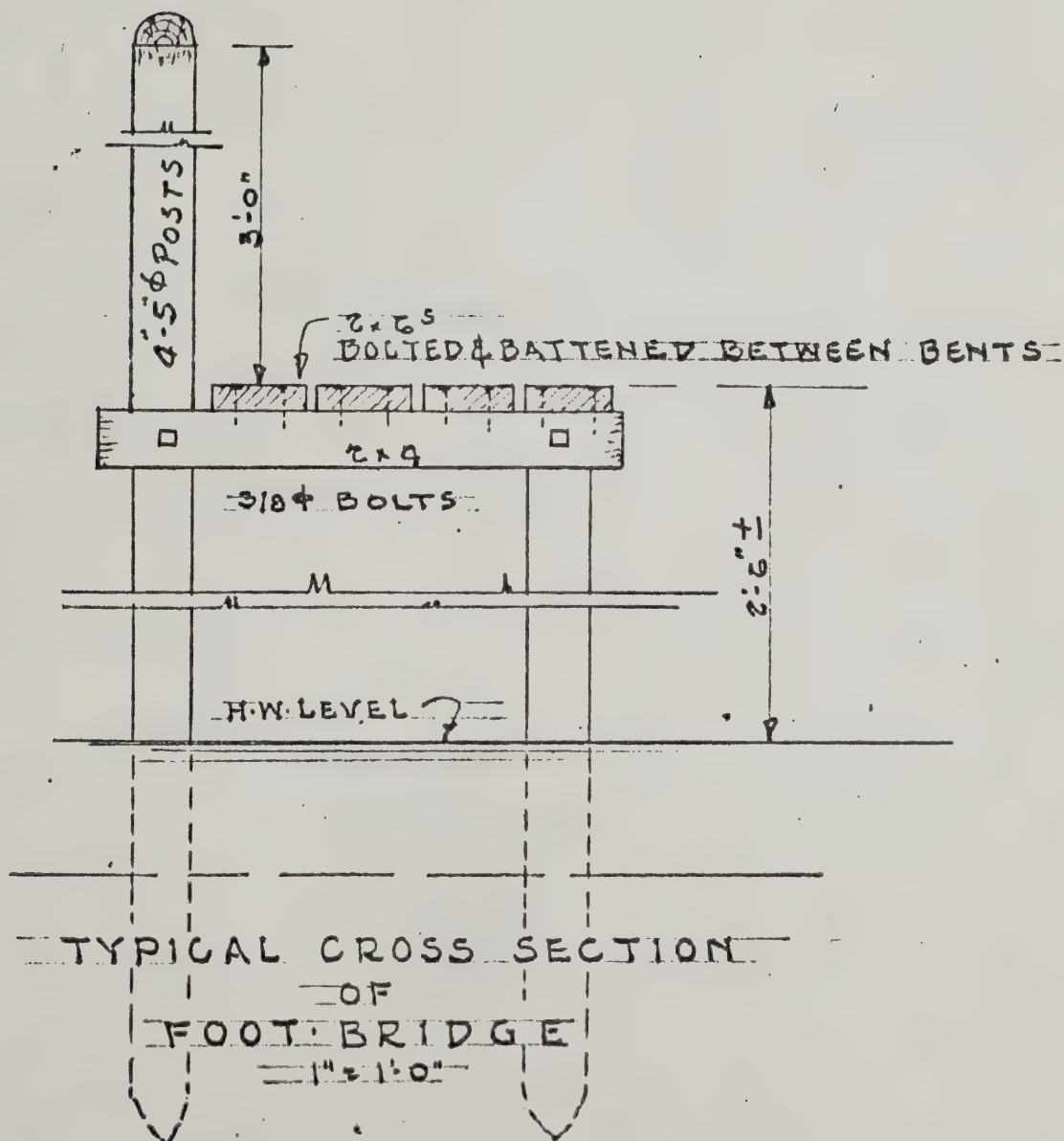


NATURE PRESERVE BOUNDARY

OLD ROADWAY

SOIL LIMITATIONS

- A NONE TO SLIGHT
- B MODERATE TO SEVERE



GOOSE LAKE PRAIRIE
TRAIL SPECIFICATIONS

49th INPC

Item 16

9/18/73

draft GBF

<u>Soil limitations</u>	<u>Treatment</u>	<u>Width in ft.</u>	<u>Length in ft.</u>	
None to slight	Mowed sod or fine rock 3 in. depth or less as needed			
Old roadway				
Walkway		3	1,040	
Stops (9 -- 20 ft. long)		6	<u>180</u>	1,220
New path				
Walkway		3	2,220	
Stops (13 -- 20 ft. long)		6	<u>260</u>	<u>2,480</u>
				3,700
Moderate to severe				
Moderate	Gravel and fine rock 6 in. or less in depth as needed			
Walkway		3	680	
Stops (4 -- 20 ft. long)		6	<u>80</u>	760
Severe	Elevated boardwalk, 2x6 parallel planks			
Walkway		2	700	
Stops (3 -- 20 ft. long)		6	<u>60</u>	<u>760</u>
				<u>1,520</u>
	Total length			<u>5,220</u>
	Total square feet			
	On ground			16,680
	Elevated			<u>1,760</u>
				<u>18,440</u>
	Cubic yards of rock			
	Fine			108
	Gravel and fine			<u>47</u>
				<u>155</u>

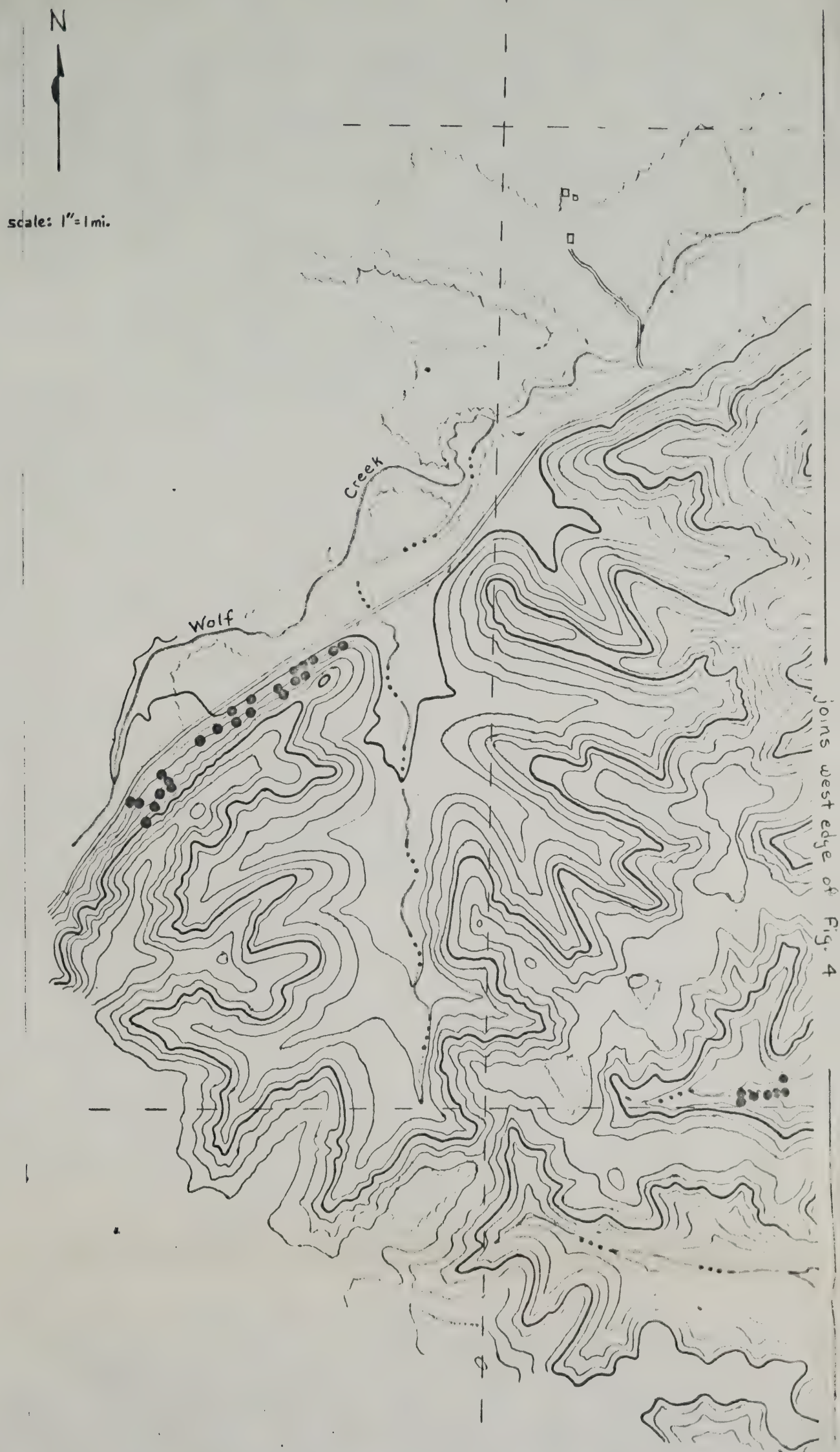


Figure 3. Topographic map of west part of area of yellowwood stand in Alexander County showing timber boundaries (~~~~~), drainage-ways (----), and contours (at 20' intervals)

Dots show the locations of individual trees located in this study

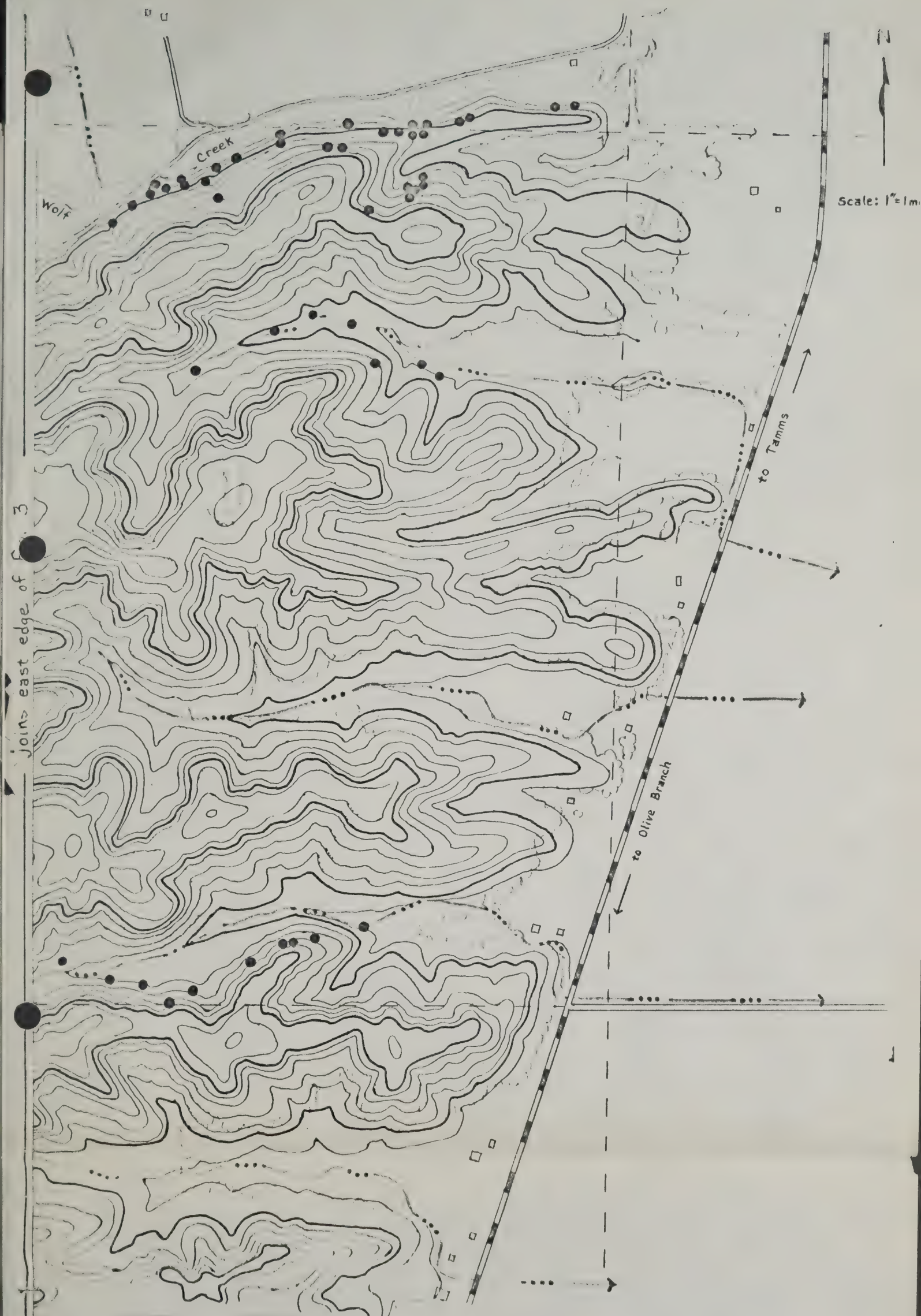


Figure 4. Topographic map of east part of area of yellowwood stand in Alexander County showing timber boundaries (~~~~~), drainage-ways (----), and contours (at 20' intervals)

Dots show the locations of individual trees located in this study

Illinois Nature
Preserves Commission
September 21, 1973
Max Hutchison

DRAINAGE CHANGES AT HERON POND AND WILDCAT BLUFF
NATURE PRESERVE IN JOHNSON COUNTY

SUMMARY AND RECOMMENDATIONS

There have been many changes in the character of Cache River and the drainage of its bordering swamps and lowlands since earliest settlement in the 1820's and 30's. Many of these changes may be due to unnatural causes or may be greatly accelerated by unnatural disturbance. If man-caused disturbances are resulting in the change of Heron Pond from a permanent swamp to a floodplain woods, dry most of the year, some management or control of drainage might be necessary to preserve an important feature of the nature preserve. It is the recommendation of this report that there be a careful study of the Heron Pond and Cache River drainage situation to determine whether any management of drainage in the nature preserve is needed. If unnatural changes are occurring, now is the time to determine such and to take corrective measures before there is a detrimental effect upon the natural character of the finest cypress swamp preserved in the Illinois Nature Preserves system.

INTRODUCTION

During 1973, the Heron Pond swamp at the Heron Pond and Wildcat Bluff Nature Preserve seemed to drain more rapidly after the heavy spring flooding, and to a lower level than it has in recent years. This is probably due to several factors, perhaps both natural and unnatural: late summer has been dry, especially during August and September; no beaver activity or repair of dams has been noted during the summer; the drainage ditches are eroding deeper and wider; and more underground drainage channels are forming with some collapsing into open ditches. The possibility of unnatural conditions resulting in change in the character of the swamp led to a very limited study of the situation by the Illinois Nature Preserves Commission staff. This report is basically a discussion of the known changes in drainage that have taken place since settlement. Some theories concerning the natural or unnatural character of these changes are presented. Further and more serious study of the situation is recommended.

PRESENT DRAINAGE SITUATION AT HERON POND

Heron Pond is an 80 acre swamp bounded by upland on the northwest, a railroad dump along the southwest (cutting off a small part of the pond), a low ridge along the southeast, and a low rise along the bank of Cache River along the northeast edge. It has a watershed of just over 400 acres and is occasionally (usually annually) flooded by Cache River when it overflows its banks. Heron Pond now drains, during times of normal and low water, to the northeast into Cache River by means of two relatively small ditches which cut through the low rise along the bank of the river. The most westerly ditch (hereafter referred to as the west ditch) extends from the edge of the pond some 70 feet to the river bank, where it is about 6 feet deep. At the point where it leaves the pond, there is a low beaver dam across the shallow channel. Water flowing over the dam has cut a small ditch into it during the last few months. The easterly ditch has a very crooked channel across a distance of about 240 feet from the pond to the river bank. It is from 2 to 3 feet deep most of its length and is blocked by four beaver dams including one where it enters another drainage channel along the pond edge. This ditch then winds across the open area of deadened timber almost to the large cypress. It is 12 to 15 feet wide and is 2 to 3 feet deep, with small narrow branch channels evidently formed by beavers. There is a low rise on each side of the main channel which is higher and drier than the bordering swamp. At three points along the northeast edge of the pond, there are ditches cutting back from the river bank and are evidently underground drainage channels from the pond that are washing large enough to collapse and become open ditches. Occasional holes in the ground along the river bank in the vicinity of the drainage ditches indicates other channels of underground drainage that are forming. These two main drainage ditches and other ditches just forming have eroded noticeably in the last several months, both deeper and wider. When the pond is full and the river is low enough, the two ditches and underground channels drain into Cache River. As the pond level lowers, the west ditch is the last to flow. The pond water continues to flow even when lower than the beaver dams by seeping underground and re-entering the ditches below the dams. As of September of 1973, the pond is low enough to cease draining, and most of the open, deadened area is dry and solid enough for easy walking. Much of the pond in the cypress stand is wet litter, roots, and decaying vegetation about 18 inches deep. The area surrounding the bases of the large trees is above the water level, but the low swags between trees, have a few inches of water above the muck. There are a few small deeper parts of the pond, especially in the west end. The open, deadened area has been dry long enough for there to be a dense heavy growth of grasses (especially sedges) and shrubby thickets of buttonbush and sugar maple are almost impenetrable. Groves

of small cypress saplings, up to 20 feet tall, are scattered in the open area at the east side of the pond. Along the outside bank of Cache River in its bend to the east at the point where the west ditch enters, there is considerable erosion with recent slumping and large trees undercut enough to lean considerably towards the stream. Some erosion across the low ridge bordering the southeast edge of Heron Pond is caused by the river current while the bottom is flooded.

PAST DISTURBANCES AND DRAINAGE CHANGES

Many obvious changes have taken place in the character of the land and streams in the Heron Pond area since the time of earliest settlement, in the 1820's. Without a good knowledge of the original character of Heron Pond and Cache River before any disturbance by man, it is difficult to distinguish between natural and unnatural changes in the drainage situation. One of the earliest descriptions is in the Geological Survey of Illinois by Worthen (1866), which mentions "...much cypress timber..." in the Cache River swamps, and "...in the west part of Section 24, the bottom (of Cache River) is more narrow. Below this point, the river is more stagnant with brown colored water and is full of drifted logs." In a report by Wall, Davisson, and Copher (1905), they describe Cache River as "...exceedingly crooked and winding in its meanders..." and "...clogged with drift wood a greater portion of the way. In many places this amounts to absolute dams through which the water can only trickle at a very slow pace." The natural drainage and original level of water in Heron Pond is not definitely known. Even the location of the channel of Cache River is not necessarily now in the same place it may have been in 1820. Heron Pond could have been subject to many unnatural disturbances affecting its water level and drainage. Early farming in the uplands of the watershed of Cache River could have caused some siltation of the stream channel and possibly accelerated meandering, bank erosion, and channel widening even before 1900. Logging has probably influenced changes in pond and swamp levels and stream character to a greater degree than is often apparent. The earliest record of cutting in the Heron Pond area was of cypress and probably several years before 1900. Hall, Davisson, and Copher (1905) mention "...the immense cypress groves...that covered large sections thirty years ago... have been depleted by the woodmen...". Logging activities may have affected the character of drainage in Heron Pond by: cutting ditches to lower the water in the pond, cutting "float roads" for logs and skidding the logs from the pond to Cache River, and by keeping the channel of the river clear of drifts and debris for floating the logs to the mill. Since 1900, certainly more definite changes and disturbances are known. A railroad was built along and through a part of the west edge of Heron Pond in 1905-1910. The Forman Floodway and Post Creek Cut-Off

(constructed about 1916) provided a new channel for Cache River water through the bottom land and into the Ohio River, thereby carrying the water much faster than the old meandering channel. Loggers during the early 1900's probably caused disturbances in Heron Pond drainage by continuing efforts to drain the pond, continuing to skid logs from the pond to the river (thereby possibly cutting a ditch), and by keeping the river clear of debris and increasing its rate of flow. Many efforts to drain the bottoms upstream along Cache River resulted in tributary drainage ditches and channel straightening that helped increase the rate of flow and thereby increased bank erosion, meander changes, and deepening of the channel. During the late 1950's, beaver moved into Heron Pond, dammed the drainage ditches, and raised the water level high enough to kill a band of hardwood timber (mostly sweet gum) along the edge of the pond. In 1963-1964, loggers made determined efforts to drain the pond by dynamiting the beaver dams. Although they were not very successful, the pond was lowered enough for the deadened timber to be cut and removed. Until the spring and summer of 1973, beaver occupied the pond, at least most of the time, and kept their dams repaired. They have never seemed to be able to stop the seep water from flowing underground and bypassing their dams. This seepage seems to have gradually increased in recent years and may have been a factor in the beavers leaving the pond.

CONSIDERATIONS IN THE DETERMINATION OF NATURAL VERSUS UNNATURAL DISTURBANCES AND EFFECTS

There is considerable evidence that must be weighed in determining the extent of natural versus unnatural disturbances in the drainage situation at Heron Pond.

From the early meager accounts it seems that Cache River was naturally a sluggish, meandering stream, filled with drift wood and debris. The generally wide bottomlands upstream and heavy timber would probably have kept the water in the streams (as well as the ponds) at a more stable level than today. Thus, there might have been more stable banks, with meandering progressing at a much slower rate. Surely the drainage of hundreds of acres of bottomland upstream, channel changes by straightening and dredging Cache River and its tributaries, and the construction of the Forman Floodway and Post Creek Cut-Off have increased the fluctuation of its water level, increased the rate of bank erosion and stream channel change, and deepened the channel. Cache River could be eroding closer to Heron Pond and thereby shortening the distance for drainage thus increasing the possibility of seepage and underground drainage channels developing. If the river channel is deepening, it is also deepening the drainage ditches from the Pond. Evidence that the river channel is changing rapidly in the last few years can definitely be seen downstream from Heron Pond near the Bird Spring (or Forman)

Swamp, where large sections of the bank that used to have a road along it are gone. Bird Spring Swamp is now drained so rapidly by an eroding ditch into Cache River it can hardly be called a swamp. The river channel at old fords that used to cross Cache River both above and below Heron Pond is now so deep that it would be difficult to construct crossings with banks sloping enough to travel even with a team and wagon. Old sections of Cache River, cut off by the Forman Floodway ditch, have a much shallower channel than the river has today.

There is some question as to the original level of the water in Heron Pond and the location of its original drainageway. It is possible that 150 years ago the pond level was at the level it was raised to by beaver dams in the early 1960's. One old resident of the area thought that Heron Pond originally drained to the southeast into Cache River near where the railroad dump is now located. He thought that the ditches were cut into Cache River along the northeast side of the pond by loggers, perhaps in the 1800's, either to drain or to skid logs into the river. The timber (mostly sweet gum) deadened by the raise in the water level by the beavers in early 1960's was less than 100 years old. It might be a possibility that the pond level was lowered when ditches were first cut into Cache at the northeast edge, the cypress was practically clear cut around the edges, and sweet gum replaced that portion of the swamp to then be killed by the beaver dams when the water raised back to its old original level.

But, whether the higher level of the pond held by the beaver dams is natural or not, it has probably contributed to the erosion of the existing drainage ditches and to the formation of new drainage channels. Cache River may have eroded closer to the pond and deepened its channel and the higher pond level may have brought the pond closer to the river, increasing the erosion of existing ditches, and increasing pressure on weak places in the bank. If there is no interference by man or beavers, it may be that the water level of the swamp will soon only extend to the edge of the large cypress and be much shallower than perhaps it has ever been.

CONCLUSIONS

No definite conclusions were reached in this report as to whether there is a real problem at Heron Pond or not. Any action would have to be determined by further study. If the changes in drainage are unnaturally caused, perhaps there should be some decisions made as to the advisability and feasibility of corrective measures.

LITERATURE CITED AND SELECTED
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Englemann, Henry. 1866. Geological Survey of Illinois, by
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Wall, W. A.; Davisson, Andrew; and Copher, H. H. 1905. Report
of Board of Cache River Drainage Commissioners of Illinois.
Illinois Printing Company, Danville, Illinois. 29 p. and
maps.

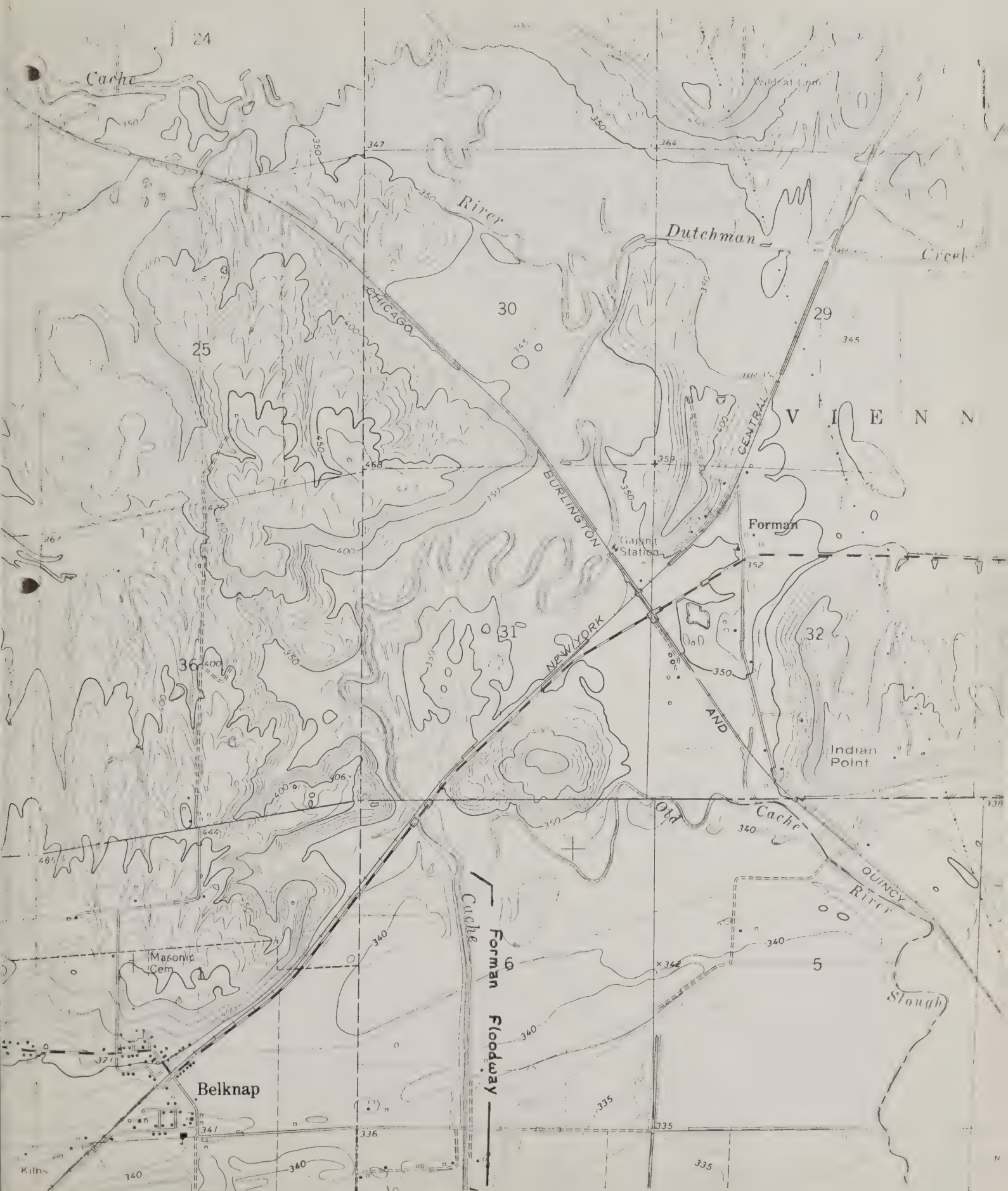


Figure 1. Topographic map of Heron Pond area in Johnson County, T. 13 S., R. 3 E.



Figure 2. Map of Heron Pond and features of drainage as of September, 1973 - Heron Pond and Wildcat Bluff Nature Preserve - Johnson County

DEDICATION OF AN ADDITION TO
ROBESON HILLS NATURE PRESERVE, LAWRENCE COUNTY, ILLINOIS

KNOW ALL MEN BY THESE PRESENTS, that VINCENNES UNIVERSITY,
of Vincennes, Indiana, being the owner thereof, does hereby dedicate the following
described real property as a nature preserve:

Tract 1: Part of Locations 22 and 23 in Township 3 North, Range 10 West, in Lawrence County, Illinois, described as follows: Beginning on the southwest line of said Location 22, 31.50 chains East and 20.32 chains South $46^{\circ}45'$ East from the northeast corner of the northwest quarter of Fractional Section 8, Township 3 North, Range 10 West, 2nd Principal Meridian; thence South $46^{\circ}45'$ East, along said southwest line of said Location 22, 32.24 chains (2,128 feet); thence North $43^{\circ}15'$ East, 3.15 chains (208 feet); thence North $46^{\circ}45'$ West, 12.76 chains (842 feet); thence North $18^{\circ}15'$ East, 4.61 chains (304 feet); thence North $46^{\circ}45'$ West, 2.18 chains (144 feet); thence South $58^{\circ}30'$ West, 4.61 chains (304 feet); thence North $46^{\circ}45'$ West, 2.42 chains (160 feet); thence North $30^{\circ}00'$ East, 8.48 chains (560 feet); thence North $4^{\circ}15'$ West, 7.03 chains (464 feet); thence North $46^{\circ}45'$ West, 3.15 chains (208 feet); thence South $56^{\circ}45'$ West, 2.67 chains (176 feet); thence North $69^{\circ}00'$ West, 1.69 chains (112 feet); thence South $42^{\circ}45'$ West, 12.61 chains (832 feet) to the place of beginning, containing 24.7 acres, more or less.

Tract 2: Part of Locations 22, 23, and 24 in Township 3 North, Range 10 West, in Lawrence County, Illinois, described as follows: Beginning on the southwest line of said Location 23, at the point of its intersection with the north right-of-way boundary of U.S. Highway 50; thence North $4^{\circ}00'$ West, generally following the west right-of-way boundary of the powerline, 29.82 chains (1,968 feet); thence North $86^{\circ}00'$ East, 2.18 chains (144 feet); thence North $4^{\circ}00'$ West, 9.45 chains (624 feet); thence North $61^{\circ}15'$ West, 7.27 chains (480 feet); thence South $84^{\circ}00'$ West, 8.00 chains (528 feet); thence South $11^{\circ}45'$ West, 23.52 chains (1,552 feet); thence South $46^{\circ}45'$ East, 655 chains (432 feet); thence South $43^{\circ}15'$ West, 7.27 chains (480 feet); thence South $46^{\circ}45'$ East, 13.33 chains (880 feet); thence North $87^{\circ}00'$ East, generally following the north right-of-way boundary of U.S. Highway 50, 9.94 chains (656 feet) to place of beginning, containing 65.8 acres, more or less.

The property hereinabove described is dedicated for the purposes, and shall be held, maintained, and used, as provided for Nature Preserves in "An Act in relation to the acquisition, control, maintenance, improvement and protection of State parks and nature preserves", approved June 26, 1925, as heretofore amended and "An Act relating to the creation of the Illinois Nature Preserves Commission and defining its powers and duties", approved August 28, 1963, as heretofore amended. Said property is further dedicated for the

purposes, and shall be held, maintained, and used, as provided for Nature Preserves in any amendment to said Acts enacted hereafter, but no such amendment shall alter the exclusive commitment of said land to the preservation of natural conditions for the purposes specified in said Acts as of the date of this dedication.

This dedication is, however, subject to the proviso that Vincennes University reserves the right to approve or disapprove of any master plan for the nature preserve or any amendment thereto.

IN WITNESS WHEREOF, we have hereunto set our hands and seals
this _____ day of _____, 19____.

APPROVED:

Governor

APPROVED:

Director, Department of Conservation

APPROVED:

Chairman, Illinois Nature Preserves
Commission

ATTEST:

Secretary, Illinois Nature Preserves
Commission

President, Vincennes University

ATTEST:

Secretary, Vincennes University

Illinois Nature
Preserves Commission
August 17, 1973
John White &
Max Hutchison

A PROPOSAL FOR DEDICATION OF ADDITIONS TO
ROBESON HILLS NATURE PRESERVE,
LAWRENCE COUNTY, ILLINOIS

SUMMARY AND RECOMMENDATIONS

Two tracts owned by Vincennes University Junior College totaling approximately 90.5 acres are recommended for addition to Robeson Hills Nature Preserve. Dedication of these areas would preserve sugar maple - mixed deciduous forest on level to steeply-sloping uplands, sugar maple - beech forest in ravines, and upland oak - hickory forest of the Southern Uplands Section of the Wabash Border Division. Parts of the tracts are of exceptionally high natural quality, and the additions would expand and diversify the natural types in the existing nature preserve. In the proposal are buffers to the existing nature preserve as well as buffers for the areas of high natural quality in the nature preserve additions.

INTRODUCTION AND DESCRIPTION

Location (Figure 1)

The proposed additions are directly north of, and partly adjoin Robeson Hills Nature Preserve. Lawrenceville, Illinois is 8 miles west of the area, and Vincennes, Indiana is across the Wabash River, directly to the southeast. U. S. Route 50, which passes through the existing nature preserve, is south of the proposed additions, and Illinois Route 33 is just to the east.

The following is a legal description of the tracts:

Tract 1: Part of Locations 22 and 23 in Township 3 North, Range 10 West, in Lawrence County, Illinois, described as follows: Beginning on the southwest line of said Location 22, 31.50 chains East and 20.32 chains South 46°45' East from the northeast corner of the northwest quarter of Fractional Section 8, Township 3 North, Range 10 West, 2nd Principal Meridian; thence South 46°45' East,

along said southwest line of said Location 22, 32.24 chains (2,128 feet); thence North $43^{\circ} 15'$ East, 3.15 chains (208 feet); thence North $46^{\circ} 45'$ West, 12.76 chains (842 feet); thence North $18^{\circ} 15'$ East, 4.61 chains (304 feet); thence North $46^{\circ} 45'$ West, 2.18 chains (144 feet); thence South $58^{\circ} 30'$ West, 4.61 chains (304 feet); thence North $46^{\circ} 45'$ West, 2.42 chains (160 feet); thence North $30^{\circ} 00'$ East, 8.48 chains (560 feet); thence North $4^{\circ} 15'$ West, 7.03 chains (464 feet); thence North $46^{\circ} 45'$ West, 3.15 chains (208 feet); thence South $56^{\circ} 45'$ West, 2.67 chains (176 feet); thence North $69^{\circ} 00'$ West, 1.69 chains (112 feet); thence South $42^{\circ} 45'$ West, 12.61 chains (832 feet) to the place of beginning, containing 24.7 acres, more or less.

Tract 2: Part of Locations 22, 23, and 24 in Township 3 North, Range 10 West, in Lawrence County, Illinois, described as follows: Beginning on the southwest line of said Location 23, at the point of its intersection with the north right-of-way boundary of U. S. Highway 50; thence North $4^{\circ} 00'$ West, generally following the west right-of-way boundary of the powerline, 29.82 chains (1,968 feet); thence North $86^{\circ} 00'$ East, 2.18 chains (144 feet); thence North $4^{\circ} 00'$ West, 9.45 chains (624 feet); thence North $61^{\circ} 15'$ West, 7.27 chains (480 feet); thence South $84^{\circ} 00'$ West, 8.00 chains (528 feet); thence South $11^{\circ} 45'$ West, 23.52 chains (1,552 feet); thence South $46^{\circ} 45'$ East, 6.55 chains (432 feet); thence South $43^{\circ} 15'$ West, 7.27 chains (480 feet); thence South $46^{\circ} 45'$ East, 13.33 chains (880 feet); thence North $87^{\circ} 00'$ East, generally following the north right-of-way boundary of U. S. Highway 50, 9.94 chains (656 feet) to place of beginning, containing 65.8 acres, more or less.

The area is on the Vincennes, Ill.-Ind. 7.5 minute topographic quadrangle.

Vincennes University Junior College of Vincennes, Indiana owns the area.

Character of area (Figures 1 and 2)

The areas proposed for addition to the nature preserve are on the north end of Robeson Hills, a 1 mile by 1 1/2 mile isolated upland in the Wabash River bottomland, separated from the upland to the east by the river. The relatively level upland rises 100 feet above the bottomland and is bounded by steep slopes and dissected by deep ravines. The area is covered by glacial drift and loess, and bedrock outcrops only in the deepest ravines. The soils are silt loams and loams derived from the glacial material. The original vegetation of Robeson Hills was a mesophytic forest of sugar maple and other hardwoods. Parts of the upland have been cleared and cultivated, and the forest has been disturbed by grazing and timber-cutting, but some areas of high natural quality remain.

Tract descriptions

Tract 1

Tract 1 includes steep slopes which rise 100 feet above the bottomland around Robeson Pond, and also includes a relatively level upland with small ravines. The forest is dominated by sugar maple (Acer saccharum), and common associates on the level upland include slippery elm (Ulmus rubra), white ash (Fraxinus americana), Kentucky coffeetree (Gymnocladus dioicus), and American elm (Ulmus americana). Common associates of sugar maple on the slopes are basswood (Tilia americana), tuliptree (Liriodendron tulipifera), beech (Fagus grandifolia), red oak (Quercus rubra), white oak (Quercus alba), chinkapin oak (Quercus muehlenbergii), shagbark hickory (Carya ovata), mockernut hickory (Carya tomentosa), and bitternut hickory (Carya cordiformis). The understory of bladdernut (Staphylea trifolia) and pawpaw (Asimina triloba) is well developed, as is the herb layer, which includes glade fern (Athyrium pycnocarpon), appendaged waterleaf (Hydrophyllum appendiculatum), and a large number of spring ephemerals. Many large sugar maples and basswoods have been cut from the lower slopes of the tract, so the slopes are more disturbed than the old-growth slope forest in the adjacent nature preserve. However, part of the level upland in the proposed addition has forest of higher natural quality than in the adjoining nature preserve, so the addition would be a valuable complement to Robeson Hills Nature Preserve.

Also in Tract 1 is a buffer area to protect the heads of two ravines which extend from the dedicated nature preserve into a cultivated field. The heads of the ravines were formerly cultivated but erosion has forced their abandonment. Young tuliptrees, sugar maples, American elms, and sycamores (Platanus occidentalis) have become established in the gullied areas.

Tract 2

Ravines are so well developed in Tract 2 that little remains of the level upland except a central drainage divide from which long, narrow ridges extend. The area includes forested upland and ravines, fields on the level upland, abandoned farmland along the field edges and at the heads of ravines, and a powerline right-of-way.

The forest is dominated by sugar maple, and the following other trees are common: basswood, Kentucky coffeetree, white ash, slippery elm, American elm, beech, tuliptree, hackberry (Celtis occidentalis), black walnut (Juglans nigra), and bitternut hickory. Oaks and other hickories may be found with the preceding species on the driest ridgetops. Sugar maple, pawpaw, spicebush (Lindera benzoin), musclewood (Carpinus caroliniana), hazelnut (Corylus americana), and red mulberry (Morus rubra) form the understory. Groundcover is sparse in the dense shade of the

sugar maples on the uplands and consists of little more than Virginia creeper (Parthenocissus quinquefolia) in some areas, but touch-me-not (Impatiens) is abundant in openings caused by timber cutting or windthrow. Herbaceous vegetation is commonest on moist slopes, where glade fern and appendaged waterleaf are abundant; other common herbs include wild ginger (Asarum reflexum), bellwort (Uvularia grandiflora), Solomon's seal (Polygonatum canaliculatum), trilliums (Trillium), and violets (Viola).

The forest is mostly second-growth, but there are areas with no evidence of timber-cutting or where cutting has been so light that the old growth character of the forest remains. One can find 2- to 3½- foot diameter stumps generally throughout the forest, and the forest has not regained the structure and composition of a mature stand since the timber-cutting. No true overstory and understory layers have developed over much of the area, and the forest consists of sugar maples and other species in all size classes, but trees are particularly abundant up to 6 inches in diameter. Some areas have been so heavily disturbed that sugar maple saplings dominate, or in some cases relatively shade-intolerant trees such as wild black cherry (Prunus serotina) and American elm have become established. Also characteristic of the forest are scattered old sugar maples, averaging about 2½ feet in diameter, which must have been spared when the original forest was logged. There are 6 acres of old growth forest with a 4-foot diameter beech in the middle of Tract 2, and there is no sign of timber cutting on the slopes of the ravine described in the following paragraph.

In the south part of Tract 2 is a 1000-foot long, 50-foot deep ravine which drains southeastward toward U. S. Route 50. Shale crops out in the streambed and is at or very near the surface on the very-steep ravine walls, which exhibit the greatest local relief in Robeson Hills. The north-facing slope of the ravine has a nearly-pure stand of 1- to 1½- foot dbh beeches, and the south-facing slope has a sugar maple - beech - basswood association. There is a fine oak - hickory forest on the upland north of the ravine, with several 1- to 2- foot dbh white oaks and chinkapin oaks, and shagbark hickories, pignut hickories (Carya glabra), mockernut hickories, and wild black cherries which are nearly as large as the oaks. The other ridges above the hollow are more mesic, and have fewer oaks and hickories, more sugar maples, a better-developed understory of bladdernut and pawpaw, and have such trees as basswood, beech, and tuliptree, which extend up the ravine slopes nearly to the ridgetops. This hollow is of as high natural quality as the south tract of the existing nature preserve, and has the added attributes of great diversity of plants and great local relief.

History of area

The proposed additions have received varying degrees of disturbance, ranging from practically no disturbance to clearing

and cultivation. Generally, the steeper, more rugged terrain has never been cleared and has received little disturbance other than timber-cutting. Livestock grazing has probably been rather widespread in the timberland, especially on the upland. Construction of U. S. Route 50 probably destroyed areas equal in natural quality to the rest of the area.

Objectives of proposal

The objectives of the proposal are to add to the existing nature preserve and to provide buffers for better management and protection of the whole area.

AREA RESOURCES AND VALUES

Nature preserve values

Addition of the proposed tracts to the Robeson Hills Nature Preserve would expand and diversify the natural types in the existing nature preserve. Some of the most outstanding forested upland along the Wabash River in Illinois is in the dedicated nature preserve, and areas of equally high natural quality are in the proposed additions. The proposed additions have more-rugged terrain than that of the existing nature preserve, allowing for greater local relief in the mesic ravines and for drier ridgetops. The tracts proposed for dedication include a large area of upland forest, parts of which exhibit old growth characteristics and are of exceptionally high natural quality.

In addition to dedication of natural land, the proposal provides for buffers to the existing nature preserve as well as for land needed to protect the areas of high natural quality in the proposed additions.

Land condition classification (Figure 3)

Old growth forest	18.1	acres
Second growth forest	49.2	"
Young woods and thickets on formerly cleared land	9.8	"
Open fields	13.4	"
	<hr/>	
Total	90.5	acres

VULNERABILITY TO SURROUNDING INFLUENCES

There is the possibility of uncontrolled use of the area by visitors from the rest stop on Illinois Route 33 east of the area. Spraying of herbicides along the powerline right-of-way may present a problem, and there is the possibility of timber-theft, particularly of black walnuts.

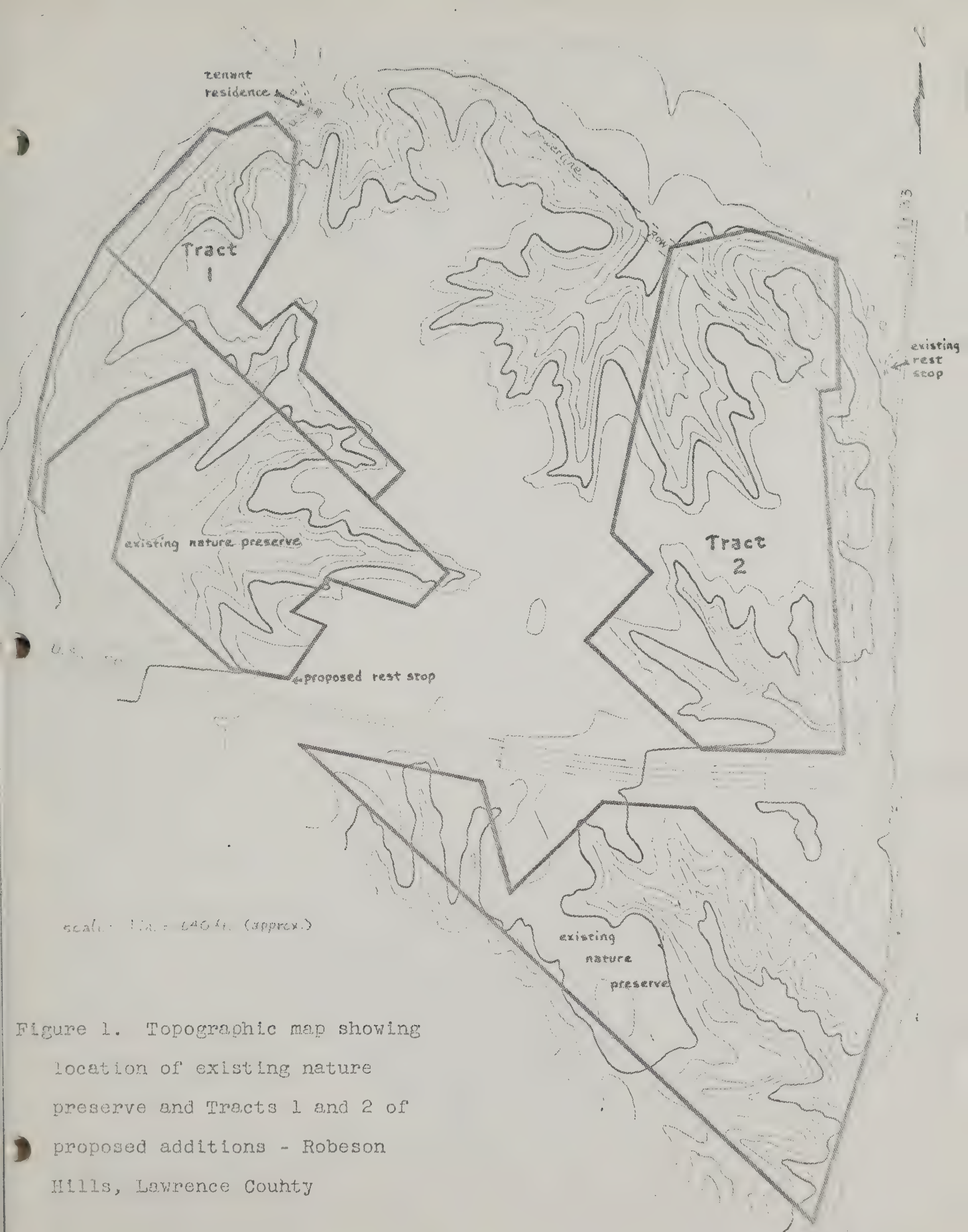
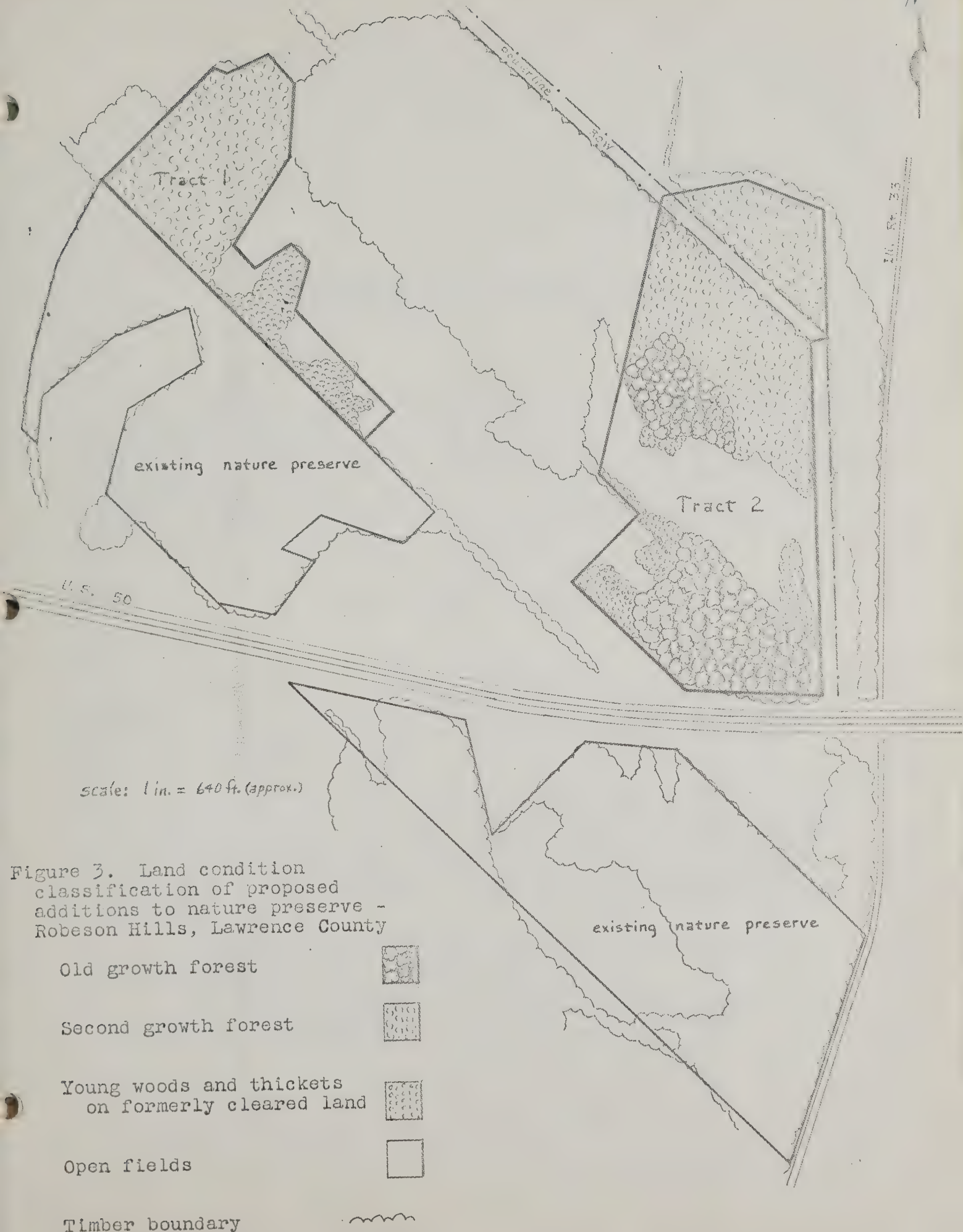


Figure 1. Topographic map showing location of existing nature preserve and Tracts 1 and 2 of proposed additions - Robeson Hills, Lawrence County



Illinois Nature
Preserves Commission
September 19, 1973
John White

PRESERVATION OF FOGELPOLE CAVE
MONROE COUNTY, ILLINOIS

SUMMARY

Fogelpole Cave is the largest cave in Illinois, and one of the least disturbed caves in the State. This extensive cave is beneath a sinkhole plain, and it may drain as much as 14.6 square miles of farmland. Fogelpole Cave has high natural quality and wilderness character, and it is the most outstanding vadose stream-passage system in Illinois. To protect the cave, access would have to be controlled, and land use practices that cause pollution of the cave waters would need to be halted.

I. INTRODUCTION AND DESCRIPTION

A. Location

Fogelpole Cave is in Monroe County, in southwestern Illinois. It is 8 miles south of Waterloo, or 3 miles north of Renault. The cave is on the Renault, Ill.-Mo. 15 minute topographic quadrangle (Figure 1).

The cave is known to underlie parts of sections 5, 7, 8, 17, and 18 of T. 4 S., R. 9 W., and section 12, T. 4 S., R. 10 W. The drainage basin of the cave covers a larger area, perhaps as much as 14.6 square miles (9300 acres) in T. 3 S., R. 9 W.; T. 3 S., R. 10 W.; T. 4 S., R. 9 W.; and T. 4 S., R. 10 W. of the Third Principal Meridian. Locations of the known entrances are as follows:

Fogelpole Entrances (2): Center of NW 1/4 of SE 1/4 of SE 1/4 of section 7, T. 4 S., R. 9 W.

Lemonade Entrances (2): Near corners of sections 5, 6, 7, and 8, T. 4 S., R. 9 W.

Illinois Covers, with Glossy (dotted line)

Northwest Entrance: Center of W 1/2 of NE 1/4 of section 12, T. 4 S., R. 10 W.

Twin Pits Entrance: NW 1/4 of NW 1/4 of section 18, T. 4 S., R. 9 W.

Southeast Entrance: NE 1/4 of NW 1/4 of section 17, T. 4 S., R. 9 W.

Collier Spring (Big Spring), where water from Fogelpole Cave resurges, or comes to the surface, is in the center of NE 1/4 of SW 1/4 of section 16, T. 4 S., R. 9 W., on the South Fork of Horse Creek.

There may be as many as 122 or more private ownerships in Fogelpole Cave's drainage basin. All of the entrances are privately owned. The main entrance, or Fogelpole Entrance, is owned by Joseph Fogelpole of Waterloo.

B. Character of the Area

Regional relationships

Monroe County has a population of about 16,000, of which 3,800 live in the county seat of Waterloo. East St. Louis and Belleville are 25 miles north of Fogelpole Cave. The Fults Hill Prairie & Kidd Lake Marsh Nature Preserve is less than 4 miles southwest of Fogelpole Cave. There are numerous small communities in Monroe County, including the following which are near the cave system: Burksville, Renault, Maeystown, and Fults. The historical settlements of Prairie du Rocher and Fort Chartres are along the Mississippi River south of Fogelpole Cave.

General character

Fogelpole Cave is in the Northern Section of the Ozark Division, part of the Salem Plateau of the Ozark Uplift. This upland borders the Mississippi River and is 200 to 300 feet above the bottomland. The area is well-dissected by small streams which drain directly into the Mississippi River bottom, as well as by larger interior drainage systems. The terrain is rugged along the Mississippi River bluffs, and the upland plain is generally rolling, because the undissected interstream divides are areas of karst topography (sinkhole plains). Upper Valmeyeran (Mississippian) rocks crop out in this area; the uppermost formation is the St. Louis Limestone, which has the best-developed

karst topography. The sinkhole plain extends the entire 25-mile length of Monroe County as a fairly continuous band up to 8 miles wide. Fogelpole Cave is on the south edge of the area, in the watershed of Horse Creek, near the Monroe-Randolph county line. The area was originally forested except on the level uplands. Today woodlands are restricted to the steepest valley walls and the most-intensely karstified terrain, where sinkholes are too large and numerous for cultivation. Most of the land is farmed: row crops, small grains, forage crops, and livestock, especially swine, are raised.

Geology

The caves and karst topography are developed in the St. Louis Limestone, which crops out in a band as much as 10 miles wide. The St. Louis Limestone is thin-bedded and has cherty layers in the upper and lower parts, but the middle beds are relatively massive and free of chert. Beneath the St. Louis Limestone is the Salem Limestone, which crops out in the Mississippi River bluffs. The St. Louis Limestone dips to the east, beneath the Renault Formation and Aux Vases Sandstone. These sandstones, shales, and limestones form the eastern border of the sinkhole plain. The area was at the edge of the Illinoian glaciation, and there is a deep deposit of loess, blown from the adjacent river bottoms. Drainage is underground, entering through sinkholes and via sinking streams. Subterranean streamcourses carry the water to springs on Horse Creek and its tributaries. Three major, parallel cave systems drain this part of the sinkhole plain: the O'Leary School - Dry Run cave system; the Illinois Caverns (Mammoth Cave of Illinois) system; and the Fogelpole Cave system, which is the southernmost and the largest.

Soils

The soils are mostly yellow and yellow-gray silt loams derived from loess under woodland vegetation. In areas of severe erosion, terra rossa (red earth), which is the residual clay that develops on limestone terrains by solution of the bedrock, is exposed.

Vegetation

Native vegetation in the vicinity of Fogelpole Cave is restricted to woodlots and odd areas that were never cultivated. Isolated, 1- to 5-acre patches of timber occur in sinkholes in cultivated fields, and larger woodlots are in groups of deep

sinkholes. Apparently all of the woods is second-growth and much of it has been grazed. The forest consists of such species as post oak (Quercus stellata), white oak (Quercus alba), black oak (Quercus velutina), black hickory (Carya texana), and pignut hickory (Carya glabra). Blackjack oak (Quercus marilandica) grows on the driest sites. The ravines near Fogelpole Cave's resurgence and the bottoms of the sinkholes have a more-mesic white oak forest, with such species as red oak (Quercus rubra), bitternut hickory (Carya cordiformis), blackgum (Nyssa sylvatica), and bladdernut (Staphylea trifolia). Prairie vegetation is common along roads, in abandoned fields, and in dry woods; in fact it is noticeably more common than in similar situations in the Grand Prairie. Common prairie species include big bluestem (Andropogon gerardii), little bluestem (Andropogon scoparius), Indian grass (Sorghastrum nutans), prairie dock (Silphium terebinthinaceum), compassplant (Silphium laciniatum), rosinwood (Silphium integrifolium), downy sunflower (Helianthus mollis), tall coreopsis (Coreopsis tripteris), blazing stars (Liatris), feverfew (Parthenium integrifolium), and prairie goldenrod (Solidago drummondii).

Fauna

Fogelpole Cave is known for its abundant invertebrate fauna, from which some significant collections have been made. A planarian of the genus Sphalloplana (probably S. hubrichti) is recorded from Fogelpole Cave. The ecology and taxonomy of this relatively rare planarian, which is found only in Illinois and Missouri, are under careful study. Also known from the cave are two troglobitic amphipods: Bacetrurus brachycaudus; and Gammarus acherondytes, a rare species known only from western Illinois. A rare case of sympatry occurs in Fogelpole Cave, for Gammarus troglophilus, an amphipod partly adapted to living in caves, coexists with Gammarus acherondytes, which can live only in caves.

The surface fauna of the Fogelpole Cave area consists of common Illinois animals, although there are some rare species on the Mississippi River bluffs near the cave. Surface animals such as bats, raccoons, and sunfish venture into the cave or spend part of their life cycle underground.

C. History of the Area

The Mississippi River bottoms near Fogelpole Cave were settled by the French early in Illinois' history. Descendents of these settlers and later immigrants settled on the uplands

and began clearing the forest and plowing the prairies. Today the area is predominantly farmland, with scattered small villages.

The sinkhole topography and caves of the area were an object of curiosity as well as a liability to the farmers, but the local residents in general have taken little interest in exploring the caves. Use of the cave systems has been limited to using them as convenient places to dump dead animals and trash, and as sources of water at the springs. One large cave, Illinois Caverns, north of Fogelpole Cave has been commercialized at various times since the St. Louis World's Fair in the early part of this century. Active interest in exploring Fogelpole Cave and nearby caves had been mostly from residents of the St. Louis area. Reverend Paul Wightman, O.F.M., has been exploring and mapping Fogelpole Cave and tracing paths of underground streams in this area for years.

D. Fogelpole Cave

Fogelpole Cave is the largest cave in Illinois. Reverend Wightman is surveying the cave and kindly and generously made all of his information available to the Nature Preserves Commission. The main stream passage is estimated to be 4 to 5 miles long, and there may be as many miles in side passages. In addition there is a stream passage connected to, but evidently parallel to, the main passage which has not been completely explored. Only part of the main passage and some of the side passages have been mapped. The main passage can be traversed for thousands of feet without stooping. It averages between 15 and 30 feet wide, and 10 to 20 feet high, although there are sections that are much larger. The side passages are smaller, and some side passages continue upstream beyond the point of exploration because the ceiling comes very near the floor or to the water surface. Some of these crawlways and perhaps some of the domes lead to other undiscovered entrances on the surface.

This system drains the largest part of the sinkhole plain, as much as 14.6 sq miles, although the area may be smaller by several square miles. The sinks and sinking streams on the upper (northwest) part of the area may drain into Illinois Caverns or Dry Run Cave, and part of the area may drain toward springs along the Mississippi River bluffs. However, the sinks and sinking streams on the upper part of the area, which might drain into the other cave systems, show an alignment with Fogelpole Cave, and a relatively large amount of water is entering the known part of the cave from this area. Sinking streams up

to a mile long drain toward Fogelpole Cave. The water from the cave comes to the surface in what probably is the largest spring in Illinois.

This is a major cave system of the type that has developed by active, free-surface streams, that is, streams that do not fill the passage completely to the ceiling except perhaps in floods. The form of the cave is directly related to the fact that it drains water from a sinkhole plain and empties it at a large spring. The cave exhibits many features related to its mode of development, including: meandering stream passages, ceiling channels, natural bridges, rimstone dams, flowstone and dripstone, waterfalls, potholes, dome-pits, canyons, and related erosional and depositional features.

There are seven known entrances to Fogelpole Cave. (The two entrances in the same sinkhole on the Fogelpole property are sometimes considered as one entrance.) All entrances are privately owned, and in each case the owner refuses free access to the cave, or the owner is unknown to cave explorers and is not asked for permission to enter the cave. The most convenient entrances are the Fogelpole entrances, but it is well known that the Fogelpole's have closed them, so the most-used entrance to the Fogelpole System may be through Lemonade Cave. The Lemonade Entrance requires crawling through a passage with little airspace above water, but it leads directly to the main part of the cave. The other entrances are either poorly known, or require ropes, climbing, or much crawling to negotiate, or are distant from the main part of the cave.

The surface karst features related to the Fogelpole Cave system are some of the best developed and most numerous in the State. There are sinking streams and swallowholes in streambeds; blind valleys, and valleys modified by collapse of cave passages; sinkhole ponds; sinkholes formed by gradual solution of bedrock entering the cave; pits and sinkholes formed by the collapse of pre-existing caverns; natural bridges; "karst windows," where a subsurface stream is exposed to the surface for a short distance before returning underground; and a major karst spring. There are a multitude of different minor solutional features on the surface of exposed bedrock. The topography and drainage of the entire area are related to the solutional activity of water entering the Fogelpole Cave system.

II. PRESERVATION VALUES

Uniqueness and rarity

Fogelpole Cave is a major vadose stream-passage cave that does not exhibit marked joint control but does flow down-

dip, and is not beneath an impermeable caprock. Such cave systems are fairly common in Missouri, Indiana, and Kentucky. However, Illinois does not have the proper geological conditions for this type of cave except in the Monroe County sink-hole plain, so these caves are rare in the State. Fogelpole Cave is the largest cave of this type in Illinois by a wide margin, and therefore is truly unique.

Diversity

Because the cave is so large, nearly every possible geological feature that could develop under the available conditions is probably represented to a greater or lesser degree. In addition to the miles of typical vadose stream passage, there are areas modified by roof collapse; upper levels that rarely if ever flood; tube-like bedding-plane passages; narrow, meandering canyons; and domes developed by both vadose and phreatic solution. With all the different habitats, the fauna of the cave must also be diverse.

Rare species

Some of the invertebrates known from the cave are fairly rare. The cave has not been extensively studied by biospeleologists, and all of the information that has been collected has not been made available, so the real value of the cave as a habitat for rare species has not been determined.

Naturalness and lack of disturbance

Fogelpole Cave remains in a relatively undisturbed state. Most of the people who enter the cave heed cave conservation principles and follow the motto, "Take nothing but pictures, leave nothing but footprints." In fact, even footprints do not spoil much of the cave, because cavers tend to walk in the main stream, which, for much of its length, flows over gravel, bedrock, and flowstone, or to walk on mudbanks that are periodically swept by floods. There are few areas of flowstone and dripstone, compared to the large areas from which it is absent, and these areas have remained essentially untouched. Local residents and casual visitors, who are the worst vandals, have mostly stayed out of the cave, so there is very little trash and markings on the walls.

The effect on the natural quality of the cave from agricultural chemicals and siltation and domestic and livestock wastes is unknown.

Replication of existing preserves

No caves of the same kind as Fogelpole Cave have been preserved in the United States. Some similar caves have been given some degree of protection by commercialization as show caves and by partial inclusion within the boundaries of state parks. The extensive cave systems of Mammoth Cave National Park in Kentucky have been protected to a greater degree than almost any other caves, but even at this park there are some unnecessary policies that are detrimental to the cave and its life. Fults Saltpeter Cave, on the Mississippi River bluffs a few miles from Fogelpole Cave, has been proposed for acquisition and addition to the Fults Hill Prairie & Kidd Lake Marsh Nature Preserve. However, Fults Saltpeter Cave is in a different setting and has developed by geological processes totally different from those that formed Fogelpole Cave, and it has completely different geological features and biological habitats.

Wilderness character

The wilderness that can be experienced in Fogelpole Cave is considered by some to be the most complete in Illinois. It takes hours to get to parts of the cave, and when one has achieved his goal he is hours from any sign of civilization: this cannot be said for any area on the surface of Illinois. Several factors contribute to the wilderness aspect of the cave: the darkness and silence; the extensive and complex passages; the physical effort, technical expertise, and equipment needed to reach parts of the cave; the dangers of flash flooding; and the difficulties that would be encountered should a medical emergency occur. Although roads and farms may be only 100 feet above the explorer, physical and psychological factors combine to give one a wilderness experience.

Scientific value

The scientific value of Fogelpole Cave has hardly been realized: the possibilities for research are great. Because of the physical nature of the cave, scientific studies would mostly be limited to observations and basic investigations of the cave and its life. Other caves are better suited for manipulative and experimental research, and some caves, such as the Ozark Underground Laboratory in Missouri, have been developed for these purposes.

Public enjoyment

The general public does not visit Fogelpole Cave because the owners do not permit access, and because one must crawl and climb in wet and muddy passages. However, the cave is such an attraction to some people that they trespass to explore it. Uncontrolled visitation will continue to damage the relationship between the cavers and the cave owners, and will lead to a gradual accumulation of intentional and unintentional vandalism in the cave. Illinois Caverns is the second-largest cave in Illinois and it is directly north of Fogelpole Cave. This cave is better-suited for visitation by the public because it is open to the public for a fee. It is better-decorated with cave formations than is Fogelpole Cave, and it has been partly "improved," although it is still a "wild cave" without electric lights in which one can explore for miles.

III. DISCUSSION

If the State of Illinois were to take an active interest in preserving Fogelpole Cave, several actions would need to be taken.

Basic to all other actions, an accurate survey of the cave would be needed. Without a map it is impossible to understand the extent and complexities of a large cave system, because the cave is hidden beneath the surface. The passages would have to be completely mapped, the entrances would have to be located, and the limits of the cave's drainage basin would have to be determined. The cave could probably be mapped in 2 weeks by two crews of expert and dedicated cavers. Such manpower is available in Illinois.

The drainage basin of the cave may be as large as 14.6 square miles, although this would need to be determined by surveying and dye-tracing. Although cave passages large enough to be traversed by man may underlie less than half of this area, the whole basin would be of concern in protecting the cave. Disposal of sewage would be of particular concern because human wastes can be carried far in a short time by actively flowing streams beneath the sinkhole plain. Careless farming practices which introduce excessive amounts of soil and chemicals would have to be controlled, as well as dumping of trash and dead animals in sinkholes.

Sealing natural openings to a cave and making new entrances alter the patterns of airflow, and can result in changes in the deposition of secondary minerals such as stalactites and and changes in the biology of the cave. Measures would have to

Illinois Nature
Preserves Commission
August 29, 1973
John White

INVENTORY OF
NATURAL AREAS .

NAME: Behre Bluff, Perry County, Illinois.

SIZE: Approximately 50 acres.

LOCATION: The area is 8 miles north of, and 3 miles east of Pinckneyville, near Todds Mill. It is in the S 1/2 of the SE 1/4 of sec. 4, T. 4 S., R. 2 W. (Pinckneyville, Ill. 15' topographic quadrangle) (Figure 1).

OWNERSHIP: Behre Bluff is in parts of three private ownerships.

INPC FRAMEWORK: Upland flatwoods and ravine forest of the Mt. Vernon Hill County Section of the Southern Till Plain Division.

GEOLOGY: The Behre Bluff area consists of a flat upland drained by a deep, narrow ravine. Drainage is to the north along an intermittent stream into Panther Creek, tributary to Beaucoup Creek in the Big Muddy River watershed. Illinoian glacial till and loess form the upland, and bedrock (probably the Pennsylvanian Modesto Formation) is near the surface on the valley slopes and crops out in the ravine. The ravine is walled by ledges and nearly-vertical to overhanging sandstone cliffs. The ravine walls are subparallel, 50 feet apart and 10 feet high in the upper part of the area, and become about 100 feet apart and 12 feet high toward the lower end of the ravine. At the lower end a tributary ravine enters from the east and the steep-walled ravine becomes a broader valley with fewer cliffs.

SOILS: The soils on the uplands are silt loams derived from loess and glacial till. The flats are poorly drained because the subsoil is impervious, but surface drainage is good on the valley slopes. The soils of the ravine-bottom are fertile and well-drained, derived from colluvium and alluvium.

VEGETATION: Vegetation includes upland flatwoods, woodland on slopes, and ravine-bottom forest.

The ravine-bottom has a mesic oak - hickory forest. The dominant trees, listed in descending order of importance, are: white oak (Quercus alba, which accounts for about one-third of the overstory), red oak (Quercus rubra), black oak (Quercus velutina), shagbark hickory (Carya ovata), and black walnut (Juglans nigra). Other overstory trees include wild black cherry (Prunus serotina), bitternut hickory (Carya cordiformis),

pignut hickory (Carya glabra), sweet pignut hickory (Carya ovalis), slippery elm (Ulmus rubra), blackgum (Nyssa sylvatica), and white ash (Fraxinus americana). American elm (Ulmus americana) and sycamore (Platanus occidentalis) grow along the intermittent stream. The overstory trees are mostly 1 to 2 feet in diameter and 70 to 80 feet tall. There is an understory or second canopy of redbud (Cercis canadensis), flowering dogwood (Cornus florida), and sassafras (Sassafras albidum); and there is a shrub layer dominated by pawpaw (Asimina triloba) and bladdernut (Staphylea trifolia). Hydrangea (Hydrangea arborescens), slippery elm, hazelnut (Corylus americana), and red mulberry (Morus rubra) are also present. The following herbs are characteristic of the ravine floor: jewelweed (Impatiens), wild geranium (Geranium maculatum), violets (Viola), bedstraw (Galium), jack-in-the-pulpit (Arisaema triphyllum), and green dragon (Arisaema dracontium). Eight kinds of ferns also grow in the ravine.

The flat upland has a dry oak - hickory forest. Post oak (Quercus stellata) is dominant and is generally the commonest tree throughout the community, but white oak replaces post oak along the drainageways, and blackjack oak (Quercus marilandica) occurs almost to the exclusion of other trees on the flattest, most-open areas. Black oak is common throughout the woods, and black hickory (Carya texana), pignut hickory, and sweet pignut hickory are also common. The basal area averages 55 square feet per acre. Young oaks and hickories are common, but there are few understory species. Smooth sumac (Rhus glabra) grows in some of the open, relatively treeless areas. The ground-cover is sparse; large, flat areas are covered with leaf litter and have practically no herbaceous vegetation. Virginia creeper (Parthenocissus quinquefolia) and summer grape (Vitis aestivalis) spread across these open areas. Characteristic herbs of the upland flatwoods include mountain mint (Pycnanthemum flexuosum), yellow ironweed (Verbesina alternifolia), feverfew (Parthenium integrifolium), little bluestem (Andropogon scoparius), and other grasses and sedges.

Along the valley slopes, between the upland flatwoods and the ravine floor, white oak dominates the forest. Herbaceous vegetation is more prevalent than in the flatwoods, and the understory is more diverse and includes New Jersey tea (Ceanothus americanus), hophornbeam (Ostrya virginiana), and shadbush (Amelanchier arborea).

FAUNA: The bullfrog, eastern box turtle, blue racer, common mole, eastern chipmunk, woodchuck, raccoon, and white-tailed deer are known from the area. Small fish and crayfish live in shaded pools in the intermittent stream. Common birds include the robin, cardinal, mourning dove, eastern towhee, wood thrush, red-eyed vireo, and flycatchers and woodpeckers. In the evening the pileated woodpecker's call may be heard, followed by those of the whip-poor-will, chuck-will's-widow, and barred owl.

USE AND DISTURBANCE: There is an abandoned homesite (log house) at the edge of the area, and Behre Bluff probably received heavy visitation by the residents; it was formerly a picnic spot because it is so scenic. The surrounding land consists of pastureland, cultivated fields, and second-growth woodland (Figure 2). The Behre Bluff area has been grazed but grazing and other disturbances have been light, and the area is now an unused woodlot.

The most impressive part of the natural area is the deep, mesic ravine with its large trees. There is no evidence of timber-cutting in the ravine, and the structure and composition of the forest indicate that it may be virgin. The white oak woods above the ravine has been logged, but the post oak flatwoods is of high natural quality and may also be virgin. The largest trees in the ravine include a 25-inch diameter (dbh) shagbark hickory, a 32-inch dbh red oak, a 30-inch dbh white oak, a 21-inch dbh sweet pignut hickory, and a 22-inch dbh black oak. All of these trees are tall and straight-trunked. The trees in the flatwoods are smaller because of poorer growing conditions, not because the forest is younger: a 21-inch dbh blackjack oak is about 140 years old.

COMMENTS: Behre Bluff is of high natural quality because it lacks much unnatural disturbance and it is unique because of its deep, mesic ravine, with its sandstone cliffs, old-growth forest, and diverse and well-developed understory and herbaceous vegetation. Although bedrock outcrops are not rare along small streams in the Beaucoup Creek drainage, it is surprising to find bluffs in this part of Illinois, and Behre Bluff has some of the tallest cliffs in the region. The upland flatwoods is of high natural quality, but despite the heavy cutting and grazing which most of the upland forest in the region has received, small post oak woodlots of the same high natural quality as at Behre Bluff are probably fairly common, although such areas have not been inventoried or studied.

Behre Bluff is comparable in natural quality and nature preserve values to two other outstanding forests in the southwest part of the Southern Till Plain Division which have received Nature Preserves Commission attention: Posen Woods and Lively Grove. Posen Woods is a few miles north of Behre Bluff and adjoins the Washington County Conservation Area. The post oak flatwoods at Posen Woods is particularly noteworthy because the trees are so large, probably because of good growing conditions. Lively Grove's most outstanding feature is its white oak timber on gently rolling topography. The rocky, mesic ravine habitat of Behre Bluff is absent from these two areas. All three woods have features in common, but there are various degrees of development and expression of these natural features at each of the areas.

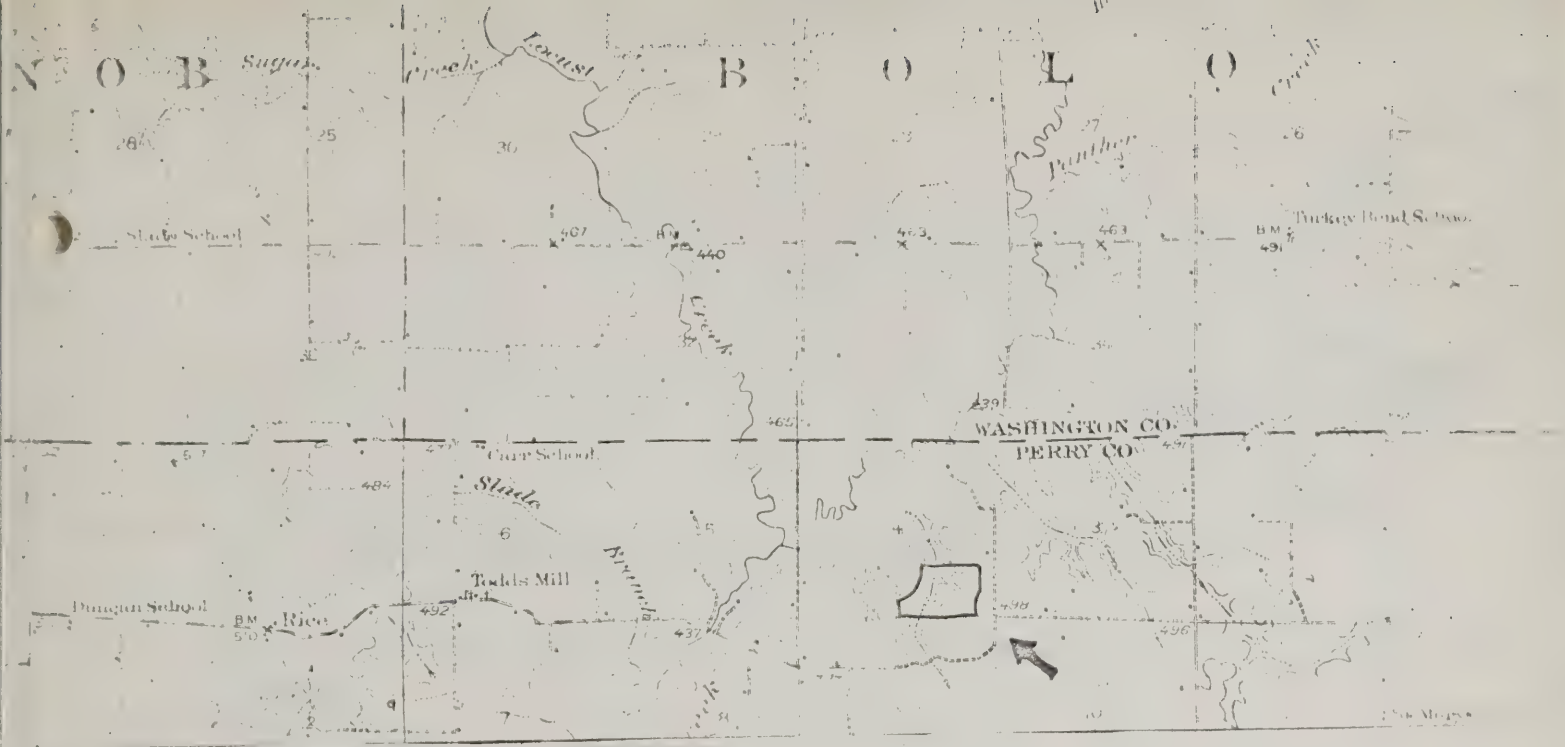


Fig. 1. Location and topographic map -- Behre Bluff, Perry Co., Ill.

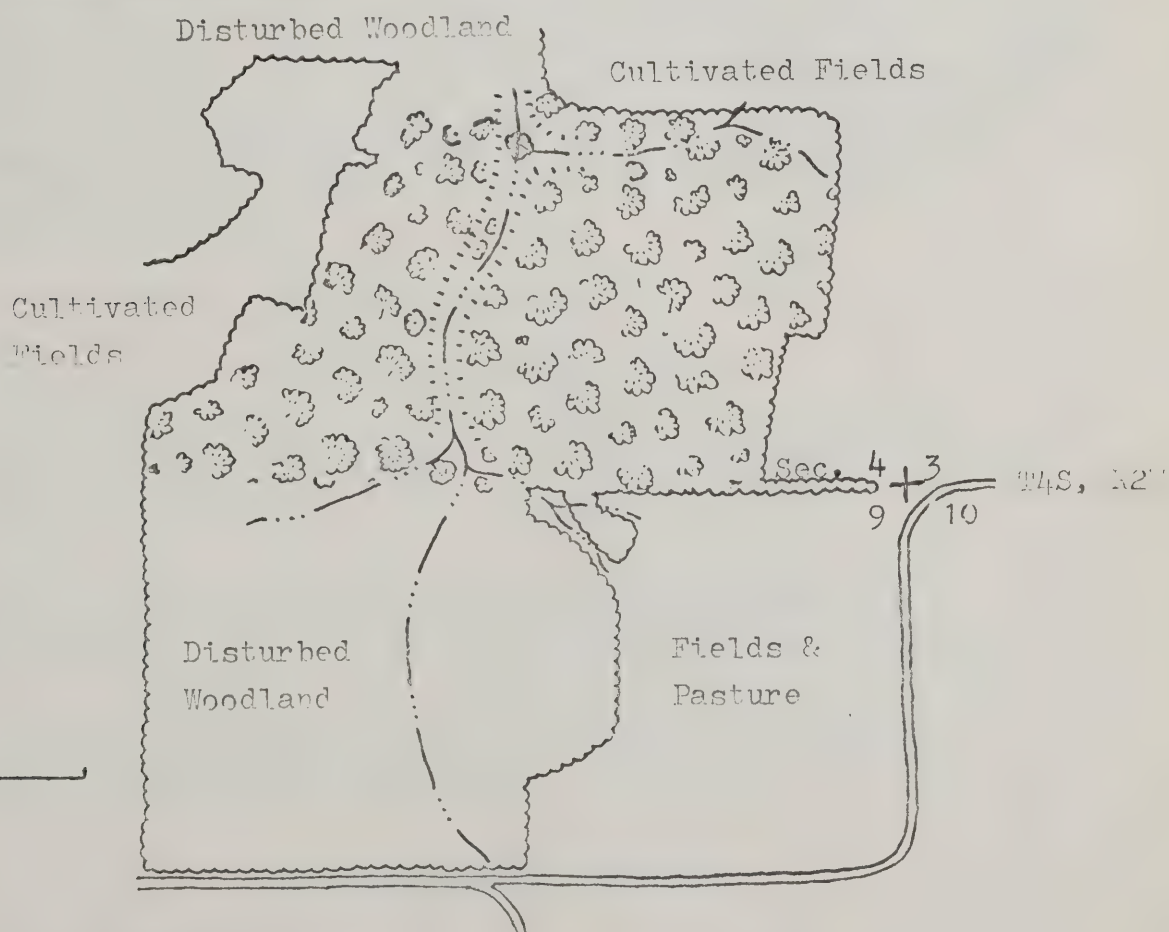



Fig. 2. Land condition map -- Behre Bluff, Perry Co., Ill.
Natural area is shown by  symbols.

Illinois Nature
Preserves Commission
September 13, 1973
John White

NATURE PRESERVE POTENTIAL OF TWIN CULVERT CAVE
PIKE COUNTY, ILLINOIS

Section 17, T. 7 S., R. 2 W. of the 4th P.M.

5 acres

SUMMARY AND RECOMMENDATIONS

Twin Culvert Cave is a medium-sized limestone cave in the Driftless Section of the Middle Mississippi Border Division. The land above the cave has been heavily disturbed but includes a prairie remnant, and the cave contains outstanding geological and biological features. The Illinois Chapter of The Nature Conservancy is attempting to buy 5 acres including the cave, and if the area is acquired it should be dedicated as an Illinois Nature Preserve.

I. INTRODUCTION AND DESCRIPTION

A. Location (Figure 1)

Twin Culvert Cave is in Pike County, in west-central Illinois. It is 2 miles west of, and 1 mile south of Pearl. The area is on the Pearl, Ill.-Mo. 15 minute topographic quadrangle.

The entrance to the cave is in the southeast quarter of the northwest quarter of the southwest quarter of section 17, T. 7 S., R. 2 W. of the 4th principal meridian.

The cave's entrance is owned by the Illinois Central Gulf Railroad, but the cave extends beneath the railroad and under land owned by Paul Smith.

B. Character of the area

Regional relationships

Twin Culvert Cave is in Pike County, which is bordered

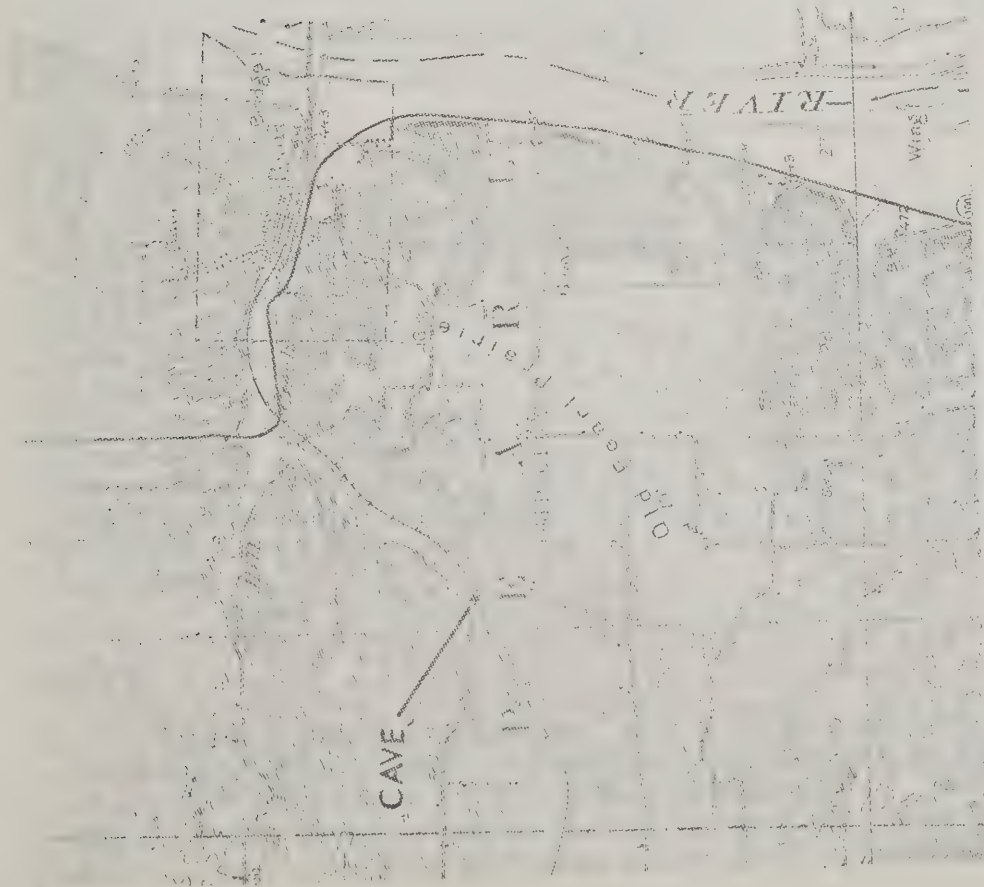


Figure 1. Location and topographic map of Twin Culvert Cave, Pike Co., Ill.

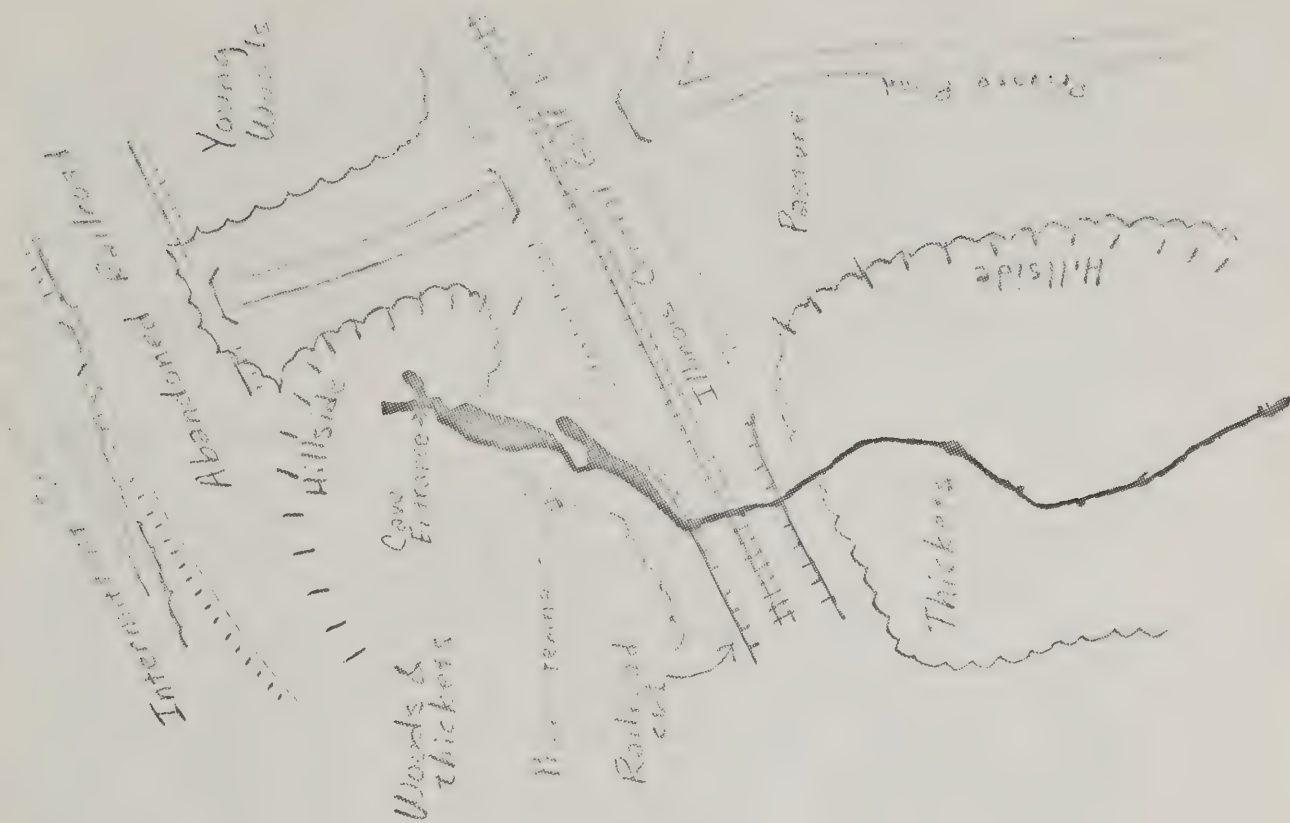


Figure 2. Sketch map of Twin Culvert Cave vicinity, Pike Co., Ill.

by both the Illinois River and the Mississippi River. The county is predominantly rural; the population is 20,500, and the largest town is Pittsfield, the county seat, with a population of 4,000. There are several other towns of a few hundred people in the county. Siloam Springs State Park is 32 miles to the north, and Pere Marquette State Park is 32 miles to the south of the cave. Quincy is 40 miles northwest of Twin Culvert Cave, Springfield is 60 miles to the east, and St. Louis, Missouri is 60 miles to the south.

General character

Twin Culvert Cave is in the Driftless Section of the Middle Mississippi Border Division, which consists of rugged, well-dissected terrain outside the limits of Pleistocene glaciation between the Illinois and Mississippi rivers in Pike and Calhoun counties. The cave is on a tributary of Hill Creek, a small stream which drains part of the east side of the divide between the Illinois and Mississippi rivers (at an altitude of 700 feet above sea level) and enters the Illinois River at Pearl at 420 feet. The land is rugged along the Illinois River bluffs, and there is commonly 200 feet of relief per mile. This rugged terrain was formerly forested, although a high, nearly undissected area directly south of Twin Culvert Cave is named Old Pearl Prairie. Agriculture, especially swine raising, is a major industry in Pike County.

Geology

The cave is in the point of a spur along the north edge of the upland called Old Pearl Prairie. The bedrock is Lower Mississippian, probably the Burlington Limestone. The limits of Pleistocene glaciation in the vicinity of the cave are subject to conjecture: Twin Culvert Cave may be at the very limit of the area covered by the Illinoian glacier, or the cave may be about 1 mile to the west. The limit of the Kansan glacier is less than 10 miles west of the cave. Regardless of the exact position of the glacial boundaries, there is glacial outwash on the upland south of Twin Culvert Cave, and there are eroded loess deposits in the area.

Soils

Above the cave entrance the soil is thin because of bedrock outcrops, natural erosion, and disturbance during construction of the railroad rights-of-way. The bedrock is masked by colluvium below the entrance, and the soil is deeper and higher in organic matter. The pastureland beneath which

the cave extends has a yellow silt loam.

Vegetation

The most natural vegetation is around the cave entrance. Above the cave is a prairie remnant, about 50 feet square, with species such as little bluestem (Andropogon scoparius), prairie dock (Silphium terebinthinaceum), tall coreopsis (Coreopsis tripteris), stiff coreopsis (Coreopsis palmata), yellow coneflower (Ratibida pinnata), feverfew (Parthenium integrifolium), Carolina rose (Rosa carolina), and prairie willow (Salix humilis). Oaks and hickories are invading the prairie. The slope around the entrance is wooded: the largest trees are chinquapin oak (Quercus muehlenbergii), sugar maple (Acer saccharum), American elm (Ulmus americana), and hackberry (Celtis occidentalis). Along the railroad rights-of-way the vegetation is mainly thickets of rough-leaved dogwood (Cornus drummondii), wild plum (Prunus americana), smooth sumac (Rhus glabra), sassafras (Sassafras albidum), and others. This brushy vegetation also covers the hill south of the railroad, above the main passage of the cave.

Fauna

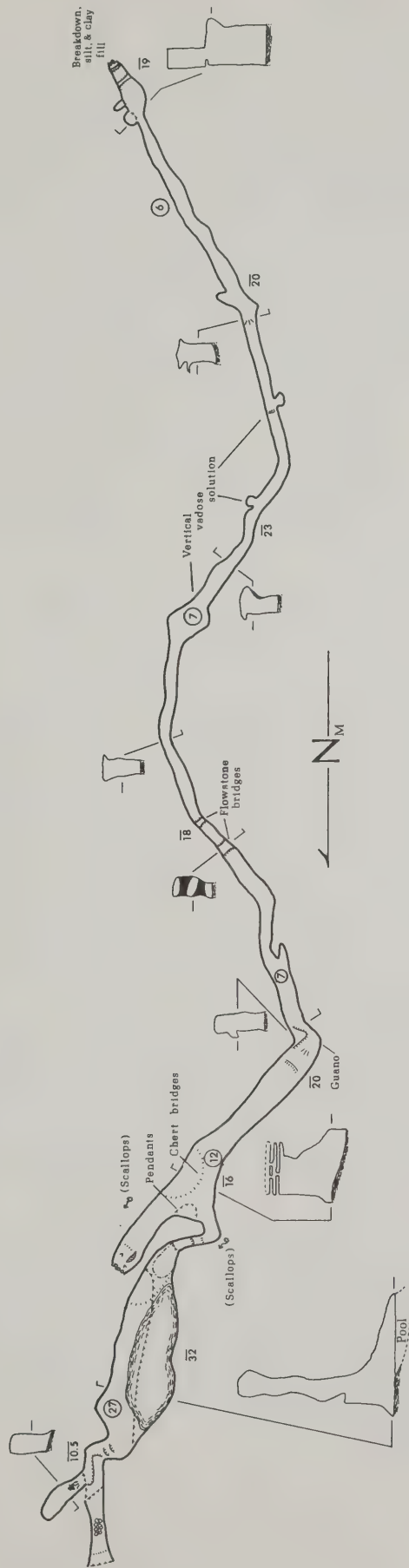
Kerr (1973) studied the bats in the cave from August 1969 to October 1970. He found the following numbers of bats: gray bat (100), little brown bat (32), eastern pipistrelle (29), big brown bat (9), and Keen's bat (2). Skaggs (1973) also studied the bats in the cave, from September 1969 to May 1972, and found the same species as Kerr found, except he found no big brown bats. It is felt that the gray bats use the cave only during migration in late summer and early fall. The bats leave large amounts of guano in the cave, which is an important source of food for cave animals.

The troglobitic (cave-adapted) amphipod (Batrachus brachycaudus) inhabits Twin Culvert Cave, as well as an undescribed species of Lumbricaria, a dipluran, probably troglobitic, which is known from a few other localities in Illinois and one cave in eastern Missouri.

A salamander larva has been noted in the cave, and a prairie king snake has been found at the entrance.

C. Twin Culvert Cave (Figure 3)

Entrance is gained to Twin Culvert Cave through a small hole formed by collapse of the cave's roof. The entrance is on a hillside between two railroad embankments,



TWIN CULVERT CAVE

PIKE CO., ILL.

Illinois Speleological Survey

PK 0002

Surveyed June 1973
By J. White & D. Coons

Ceiling heights in feet
Cross sections 2X

Figure 3. Twin Culvert Cave, Pike Co., Ill.

about 25 feet above a roadway, which passes beneath the railroads by means of large stone "culverts". Immediately upon entering, a 10-foot drop is encountered, followed by a series of ledges and steep slopes which lead to a pool, which in dry periods is 32 feet below the entrance. The pool is in a room which is about 60 feet long, 20 feet wide, and 25 feet high. The only other notable enlargement of the cave passage is a short distance past the "lake room", at a "T" in the passage, one fork of which ends in a fill within 30 feet. The main passage continues beyond this junction as a relatively uniform passage, 3 to 10 (mostly 6) feet wide and mostly 6 to 8 feet high. The floor, which is a silt and clay fill, rises and falls at intervals, so that it varies from 16 to 23 feet below the level of the entrance. The cave follows a sinuous course and terminates in a blockage of silt, flowstone, and breakdown as the passage nears the hillside, 460 feet due south of the entrance.

There is no stream in Twin Culvert Cave, although the large pool near the entrance may be connected to and fluctuate with the level of the intermittent stream outside the cave. There are small pools and muddy areas deep within the cave, fed by water descending vertically from the surface. In four places where vertical seepage has intersected the cave, the water has enlarged the passage by solution of the walls. These widenings, which might be likened to "shower stalls" are relatively recent and are actively enlarging, and are unrelated to the genesis of the main, linear cave passage. Features that are related to the development of the horizontal passages include rock pendants and scallops, which were formed by relatively fast-moving water. These pendants and scallops are exceptionally well developed, and along with extensive deposits of stratified sediments, they offer outstanding clues to the formation of the cave. Another notable feature related to the genesis of the cave are thin, discontinuous chert layers that stand out in relief because the surrounding limestone has been completely dissolved, and which form false ceilings in one part of the cave. In some areas, instead of dissolving limestone, the water has deposited flowstone and dripstone, as well as some unusual calcite (?) crystals.

Twin Culvert Cave developed before the present topography, and its formation had no relationship to the existing terrain. The erosion that is forming the present hills has intersected the cave and is in the process of destroying the cave. Apparently the cave was once a major conduit for water flowing near the water table. Bretz and Harris (1961) briefly mention the cave and discuss its relation to the surrounding terrain.

D. History of the area

The hill in which Twin Culvert Cave lies has had a history of use similar to that of surrounding hills. The area has generally been cleared of trees where practical, and used for pasture and cropland. The intensity of farming reached its peak in the 1930's, and since then much of the land has reverted to woods and thickets. A railroad grade was built along the edge of the cave's hill, but it was replaced by another right-of-way, which involved making a 50-foot-deep cut through the hill above the cave. Amateur spelunkers, school groups, and researchers have made occasional visits to the cave for years. The Nature Conservancy has been negotiating for the purchase of 5 acres including the entrance from the railroad company.

II. AREA RESOURCES AND VALUES

A. Nature preserve values

Uniqueness or rarity of natural types

A cave is a relatively unique geological and biological phenomenon: it is the product of a unique combination of physical factors and processes, which results in an unusual natural environment. The solutional and sedimentary features of Twin Culvert Cave are outstanding.

The natural types on the surface are not unique, although the small prairie remnant might be considered rare.

Diversity of natural types

Twin Culvert Cave is fairly diverse, and reflects a number of developmental processes. In addition to the main passage, there are areas of active solution by percolating groundwater, a diversity of secondary mineralizations, and a large pool. The large amount of organic matter entering the cave as entrance detritus, and brought in by bats and water is the basis for a large and diverse fauna.

Surface natural types are limited by the small size and heavy disturbance of the area. Elements of the prairie and mesic woodland are present.

Rare species

The cave is a migratory stop-over for the gray bat, which is rare in Illinois and known from only a few caves in the state. The Keen's bat, which is rarely collected in Illinois, is known from Twin Culvert Cave. The undescribed dipluran of the genus Lumesocampa in the cave is rare.

Naturalness and lack of disturbance

There has been little intentional vandalism of the cave because the difficulty of descending the entrance and crossing the first room, which is often flooded, has discouraged heavy and casual visitation.

The land above the cave has been heavily disturbed by clearing and by two railroad tracks. Construction of one of the railroad grades involved blasting a 50-foot-deep cut through the hill above the cave, and rock was quarried from the area to build an embankment for the other, abandoned right-of-way. Although the most natural vegetation is around the cave entrance, disturbance of the area has been so complete that even the prairie "remnant" may not reflect the original plant communities. The brush along the railroad and under a utility line that parallels the tracks is periodically chopped away, and several large trees that lined the crest of the hill along the railroad and across from the cave entrance were recently cut down. The blasting for the railroad, which is a few feet above the ceiling of the cave, did no apparent damage to the cave, and the bats have probably become accustomed to the periodic noise and vibration from trains passing overhead. The cave passes beneath the railroad and under a hillside thicket, which was formerly a pasture.

Replication of existing preserves

If the Mississippi River Sand Hills Nature Preserve, on the Mississippi River bluffs in Hancock County 75 miles northwest of Twin Culvert Cave, is placed in the Illinois River and Mississippi River Sand Areas Division, then there is no Illinois Nature Preserve in the Middle Mississippi Border Division. Several areas in this Division have been considered for acquisition or dedication as nature preserves, including: Pere Marquette State Park (Jersey Co.), Cap au Gres (Calhoun Co.), Cedar Glen Eagle Roost (Hancock Co.), and Loud Thunder Forest Preserve (Rock Island Co.).

Burton Cave, in the Glaciated Section of the Middle Mississippi Border Division in Adams County, has been considered for dedication as a nature preserve. Twin Culvert Cave is in the Driftless Section of this Division, and represents developmental processes different from those that formed Burton Cave.

Scientific and educational value and use

Studies comparing the bat population of Twin Culvert Cave with those of other caverns in west-central Illinois have resulted in master's theses for two Western Illinois

University students. The cave has also received visits by school groups and other researchers, especially those interested in the genesis of the cave and the life in the cave.

Public enjoyment

The cave is not suitable for visits by the general public for two main reasons. The cave is difficult to enter and traverse; and the natural features of the cave, which have been fairly well preserved, would be best protected without visits by the general public.

The two large, old stone underpasses beneath the railroad, and a small, gravel-bottomed stream are scenic surface features on the area.

B. Land condition classification (Figure 2)

The entire 5-acre tract around the cave entrance may be classified as disturbed wildland. Some of the area has been undisturbed for so long that it has a natural appearance.

III. MANAGEMENT

If Twin Culvert Cave were dedicated as an Illinois Nature Preserve, problems with visitors would be of continuing concern. Vandalism and disturbance of the life of the cave have been at a low level except during infrequent visits by inconsiderate people, and the amount of disturbance would probably continue at its present level. The entrance to the cave is dangerously steep and slippery and could result in a bad fall for someone trying to climb without a safety measure such as a handline. Although vandalism has been light and no serious accidents are known to have occurred in the cave, the situation could change as the result of a single unfortunate trip.

The ideal situation to protect a cave is to control all of the land above it, but Twin Culvert Cave extends beneath the railroad and under brushy pastureland, which would not be acquired by The Nature Conservancy. However, there are no apparent detrimental effects to that part of the cave beneath the pasture.

IV. CONCLUSION

Dedication of Twin Culvert	as an Illinois Nature
Preserve has been approved in	by the Illinois Nature
Preserves Commission. Dedicat	ould probably not protect

the cave from abuse by visitors, but such disturbance has been light and will probably continue at a low level. However, dedication would add to the Illinois Nature Preserves System a cave which displays outstanding geological features and which is of a type that probably would not be otherwise available for preservation. Dedication would also help protect the habitat of some unusual cave invertebrates and a resting area for migrating gray bats, a rare species in Illinois. The area also includes vegetation that, although disturbed, is representative of woodland and prairie of the Driftless Section of the Middle Mississippi Border Division.

LITERATURE CITED

- Bretz, J H., and S. E. Harris, 1961. Caves of Illinois. Illinois State Geol. Surv. Rep. Invest. 215. 87 p.
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- Skaggs, D. M. 1973. Occurrence of vespertilionid bats in some natural and man-made caverns of west-central Illinois. Unpub. M. S. thesis. Western Illinois Univ., Macomb. 53 p.

County Pike	Area Twin Culvert Cave		
Section 17	Township 7 South	Range 2 West	P.M. 4th
Date June 10, 1973	John White		

Rating					
Excellent +3	Good +2	Fair +1	Neutral or Nil 0	Poor -1	Very Poor -2
	X				
		X			
	X				
			X		
X			X		
	X				
	X				
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			X		
				X	
	X				
			X		
		X			
X					
2	6	4	9	4	0
8	24	16	36	16	0
6	12	4	0	-4	0

Total rating (max. +90, min. -60)	18
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Illinois Nature
Preserves Commission
September 19, 1973
John White

NATURE PRESERVE POTENTIAL OF MASSASAUGA PRAIRIE
WARREN COUNTY, ILLINOIS

Sections 13 & 24, T. 9 N., R. 2 W. of the 4th P.M.

92.1 acres

SUMMARY

Massasauga Prairie is along a small valley in the Galesburg Section of the Western Forest-Prairie Division in Warren County, Illinois. The area includes woodland, thickets, and wet prairie along drainageways, mesic prairie and disturbed open land on valley slopes, and cultivated fields and pastureland on relatively level uplands. Outstanding features of the area are a colony of eastern massasaugas and areas of prairie of high natural quality.

I. INTRODUCTION AND DESCRIPTION

A. Location

Massasauga Prairie is in Warren County, in west-central Illinois. It is 10 miles south of, and 5 miles east of Monmouth, or 2 miles north of, and 5 miles east of Roseville. The area is on the Monmouth, Ill. 15 minute topographic quadrangle. (Figure 1)

Ownership

Margaret Ray of Roseville owns 67.1 acres of the area. Grace Trummel of Macomb owns 25.0 acres, which are operated by another farmer.

Legal description

The land is described as follows: The southern 1050 feet of the southeast quarter of section 13, excepting the eastern 1135 feet of the southern 370 feet of said southeast

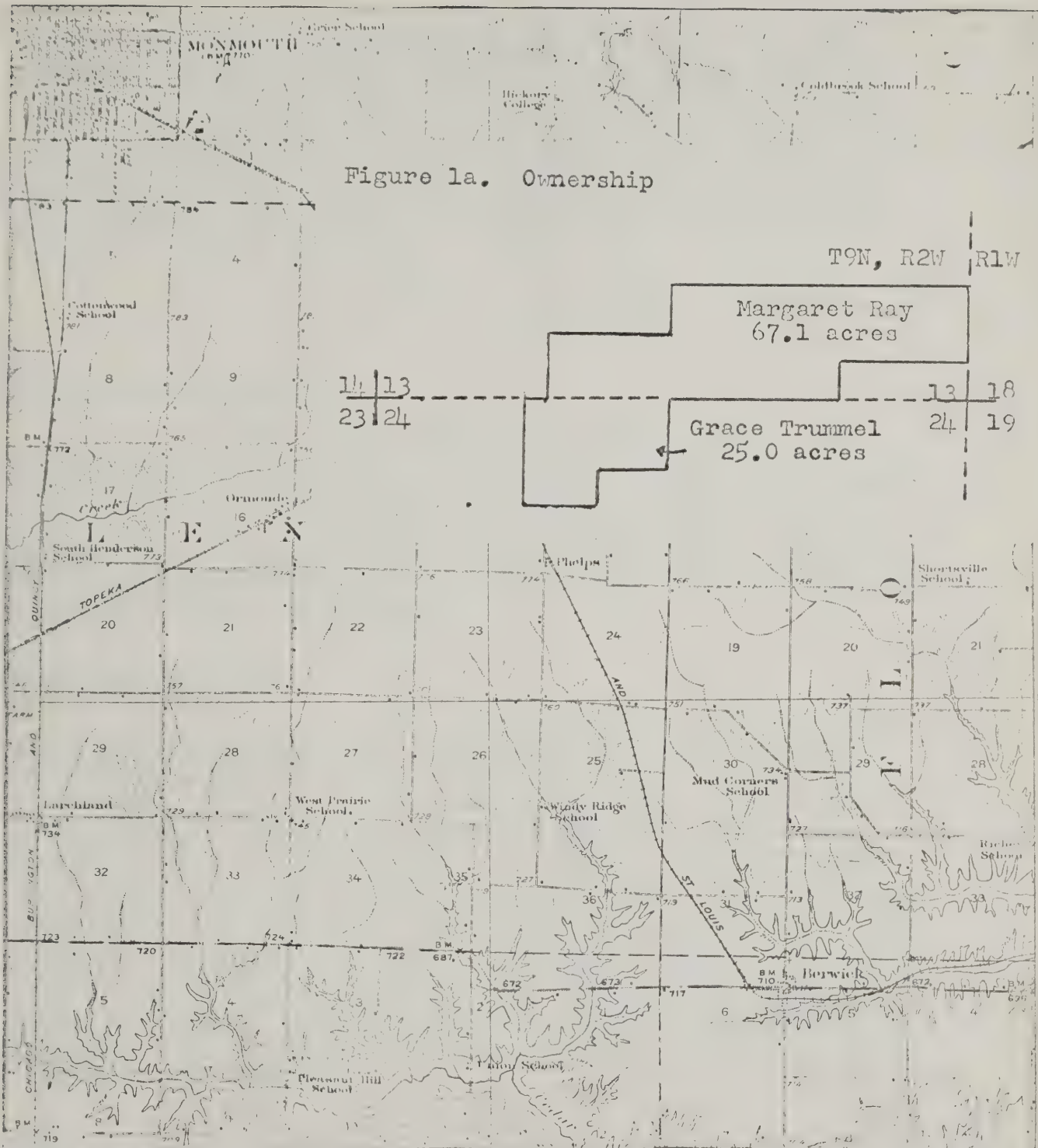
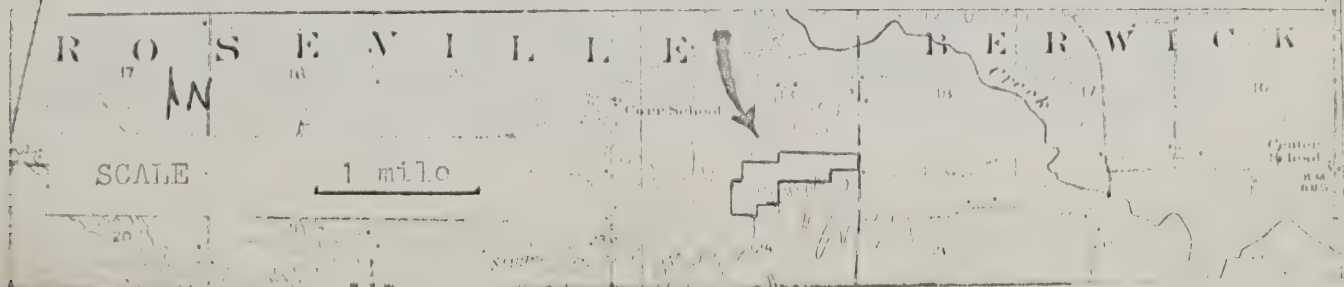


Figure 1. Location map -- Massasauga Prairie, Warren Co., N.Y.



quarter of section 13, and containing 52.1 acres; and the eastern 1070 feet of the southern 610 feet of the southwest quarter of section 13, containing 15.0 acres; and the north half of the northeast quarter of the northwest quarter of section 24, containing 20.0 acres; and the north half of the southwest quarter of the northeast quarter of the northwest quarter of section 24, containing 5.0 acres; all in Township 9 North, Range 2 West of the Fourth Principal Meridian, in Warren County, Illinois.

B. Character of the Area

Regional relationships

Massasauga Prairie is in Warren County, which has a population of about 22,000. The land is devoted primarily to agriculture and is served by a well-developed system of township roads and county and state highways. Monmouth, the county seat, has a population of 10,300, and there are numerous smaller farming communities. Peoria is 50 miles to the east, Rock Island and Moline are 50 miles to the north, and Burlington, Iowa, is 30 miles to the west.

General character

The 92.1-acre area is in the Galesburg Section of the Western Forest-Prairie Division, which is a land of intermingling prairie and forest on the dissected Illinoian glacial till plain. The relatively level upland, which was formerly prairie and is now mostly cultivated farmland, breaks into gently rolling topography along the numerous drainage systems. The major valleys were forested, and trees extended up the tributaries into the prairies, but much of the forest has been cleared and the land along the streams is pastured, or is cultivated on the gentler slopes. Massasauga Prairie is in a small valley which appears to be typical of most small valleys in the area -- with a narrow strip of trees along the stream, with pastured slopes, and with cultivated fields on the bordering uplands -- but the valley is unique because it supports native prairie flora and fauna.

Geology

The nearly-level upland surrounding Massasauga Prairie forms a divide between the Illinois River watershed and those streams flowing more directly into the Mississippi River. The topography is that of a flat glacial till plain which is being

dissected by numerous small streams. Massasauga Prairie is along the middle of a 4-mile-long, eastward-flowing intermittent stream, which drains a flat upland at an altitude of 710 to 730 feet and enters Cedar Creek at an altitude of 625 feet; in the area of Massasauga Prairie the valley is 40 feet deep and broadens from one-eighth mile to one-quarter mile. Illinoian glacial till covers the bedrock except in limited exposures in some valleys, and the glacial till is in turn blanketed by loess. In and around Massasauga Prairie there are no bedrock outcrops and glacial drift is exposed only on the steepest eroded slopes; the bottomland is of Holocene alluvium.

Soils

The soils are generally fertile prairie soils derived from loess and glacial till. Sawmill silty clay loam occurs in the bottomland; it is a poorly-drained, very dark-brown to black soil with high organic matter content. On the slopes above the stream are two very dark grayish-brown to black soils that are subject to erosion and have medium organic matter content: Velma silt loam is underlain by glacial till at 0 to 20 inches, and Assumption silt loam has glacial till at 20 to 40 inches. Gentler slopes at the heads of drainage-ways and above the valley walls have Sicily silt loam, a brown to dark brown soil with medium organic matter content, and the gently rolling uplands are of very dark brown to black Muscatine silt loam, which is high in organic matter and imperfectly drained.

Vegetation

Wooded stream border. -- Trees, shrubs, and coarse herbaceous vegetation form a strip about 100 feet wide along the stream. Along the lower course of the stream mature black willows line the banks, but the willows decrease in number and size upstream and are replaced by dense thickets of wild plum. Young cottonwoods and silver maples also grow along the stream, and gray dogwood and smooth sumac are common in the thickets. Farther upstream, at the western end of the prairie, there is a young woodland of wild black cherry, Osage orange, and American elm, with silver maple and black willow on the stream-banks. The groundcover is a mixture of coarse herbs such as goldenrod, giant ragweed, and big-toothed sunflower, and such prairie species as cord grass, Jerusalem artichoke, wild bergamont, and yellow coneflower. Herbaceous vegetation is sparse in the thickets, and consists of such plants as agrimony, asters, snakeroot, white avens, and spiderwort.

Plum thickets. -- Thickets of wild plum border the stream and extend up the drainageways and onto the upland. Gray dogwood, smooth sumac and blackberries are commonly associated with the wild plums, and the thickets are so dense that they are practically impenetrable.

Wet prairie. -- Prairie vegetation in the valley bottom consists of cord grass and blue-joint grass, with smaller patches of bulrush. The grasses occur in dense stands to the exclusion of most other plants, although such wetland forbs as boneset and arrow-vine are present. Cattail and arrowhead grow in some of the wettest areas; other notable herbs include bunchflower, closed gentian, and Turk's cap lily. Wet prairie also occurs in seepage areas on the upland, and extends partly up some of the grass waterways between the fields bordering the valley, but gradually gives way to pasture grasses or persists as scattered patches in the wettest areas.

Upland prairie. -- The prairie on well-drained slopes is broken into patches of varying natural quality among thickets and disturbed or cultivated areas. The areas of highest natural quality have a relative abundance of big bluestem, little bluestem, and such species as yellow coneflower, pale coneflower, blazing stars, rattlesnake master, tall cinquefoil, and purple prairie clover. Other notable prairie species include Indian grass, tick-clover, bush-clover, flowering spurge, wild indigo, leadplant, downy gentian, rosinweed, and compassplant. Areas that have been lightly disturbed have less prairie grass and a greater abundance of yellow coneflower, asters, and wild bergamont, and such naturalized species as Kentucky bluegrass, wild parsnip, and red clover. Besides the plum thickets there are few trees on the upland prairie; however, there are two large cottonwoods, 44 and 60 inches in diameter at breast height.

Disturbed grassland. -- A 15-acre pasture, the upper parts of grass waterways, and parts of the valley slopes that are not cultivated but have little prairie vegetation are classified as disturbed grassland. Such forage grasses as smooth brome, timothy, tall fescue, and redtop are common, with red clover, Kentucky bluegrass, bush-clovers, and many other herbs. Prairie plants in general form a small percentage of the vegetation, but in some areas the presence of yellow coneflower, pale coneflower, compassplant, and prairie grasses is conspicuous. Areas in the pasture from which plum thickets were bulldozed in 1972 are vegetated by giant ragweed, big-toothed sunflower, thistle, and Canada goldenrod.

Cropland. -- Cropland in the area has been on a rotation which includes corn, oats, soybeans, and meadow.

Fauna

Observations in conjunction with a study of eastern massasaugas are the basis for most of the information on the fauna of the area.

Invertebrates. -- Little has been learned about the invertebrates of the area. Crayfish are common along the stream, and common conspicuous insects include dragonflies, butterflies, and cicadas.

Amphibians and reptiles. -- The eastern massasauga lives in the prairie, particularly around small trees such as the wild plum. A rough population estimate from current studies would be between 50 and 75 individuals including all age classes. In addition to the massasaugas, several species of common amphibians and reptiles are known from the area:

- American toad
- Blanchard's cricket frog
- Western chorus frog
- Leopard frog
- Blue racer
- Western fox snake
- Eastern garter snake
- De Kay's snake
- Eastern massasauga

Birds. -- The area provides habitat for summer residents of open fields and grasslands, thickets, and woodlands. Nests have been found of those birds marked by an asterisk on the following list, and many of the other species undoubtedly breed on the area. In addition, six species of hawks and several kinds of migrants have been seen. A partial list of birds observed on the area includes the following:

- Cooper's hawk
- Sharp-shinned hawk
- Marsh hawk
- Rough-legged hawk
- Red-tailed hawk
- Sparrow hawk
- *Bobwhite
- Ring-necked pheasant
- Sora
- Yellow rail
- *Mourning dove
- Yellow-billed cuckoo
- Black-billed cuckoo
- Yellow-shafted flicker
- Downy woodpecker

Eastern kingbird
 *Trail's flycatcher (?)
 Blue jay
 House wren
 Short-billed marsh wren
 Mockingbird
 Catbird
 Robin
 Eastern bluebird
 *Warbling vireo
 Yellow warbler
 Yellowthroat
 Eastern meadowlark
 Western meadowlark
 *Redwing
 Brown-headed cowbird
 Cardinal
 Rose-breasted grosbeak
 *American goldfinch
 Dicksissel
 Field sparrow
 Lincoln's sparrow
 Song sparrow

Mammals. -- There has been an active red fox den in the prairie, and woodchuck burrows are common. Fox squirrels may be seen in the trees along the stream. A family of raccoons lived in a tree that has since been bulldozed away, and two fawns were killed when a hayfield, now a beanfield, was mowed. The prairie supports a large population of meadow jumping mice, and the occurrences of the masked shrew and the meadow vole are significant because the area is at the southern edge of their ranges in Illinois. The following mammals have been observed on the area:

Masked shrew
 Short-tailed shrew
 Raccoon
 Red fox
 Woodchuck
 Eastern fox squirrel
 White-footed mouse
 Meadow vole
 Meadow jumping mouse
 Eastern cottontail
 White-tailed deer

C. History and Use

The land surrounding Massasauga Prairie is cropland, but the steepest slopes have never been cultivated. Much of the area which has been cultivated has not been heavily grazed, so the prairie vegetation has not been destroyed. Brian Jay Bielema, a student from Western Illinois University, learned of the massasaugas at the prairie and subsequently completed his Master's thesis on these animals at the prairie. Concern for the preservation of the prairie with its rare fauna and vegetation arose during this study.

II. AREA RESOURCES AND VALUES

A. Nature Preserve Values

Natural character

Uniqueness or rarity of natural types. -- Relative to its former abundance, prairie has been nearly eliminated from Illinois, and it occurs only as scattered remnants, some of which have been heavily disturbed. For these reasons the prairie of high natural quality at Massasauga Prairie must be considered rare, although it is not unique in the sense that it represents an unusual natural type. Rather, it is representative of a formerly widespread and important natural type.

Diversity of natural types. -- Natural types include woodland along an intermittent stream, plum thickets, and prairie, which ranges from wet prairie in seeps and in drainageways to dry-mesic prairie on steep, exposed slopes.

Rare or unusual species. -- The wet prairie habitat of the eastern massasauga has drastically decreased since the late 1800's due to farming practices, and as a result the current range of this subspecies consists of widely scattered colonies of undetermined numbers. The population status of the eastern massasauga is unknown, and it is probably declining in numbers in most areas of its range. There have been no recent attempts to determine its numbers, and it should be considered rare until such an attempt is made.

The occurrence of the meadow vole and masked shrew at Massasauga Prairie, which is at the south edge of their

ranges, is significant, as are sightings of such birds as the shortbilled marsh wren and yellow rail in the prairie. Some of the typical native plants of the prairie, although not rare, have never been reported from the county, and such notable species as bunchflower, closed gentian, downy gentian, and Turk's cap lily grow in the area.

Naturalness and lack of disturbance. -- Seventeen acres or one-fifth of the area is of good to high natural quality; this includes woods and thickets, and prairie with at least 50% natural vegetation. This relatively small proportion reflects the large amount of cropland (one-half) in the area more than it is a result of heavy disturbance of the natural land. Outside of an area of improved pasture, grazing has been so light that the prairie grasses and forbs have not been destroyed and the plum thickets have not been replaced by hawthorn, honey locust, and Osage orange. Little more than the present cropland has been cultivated, although some of the upland prairie apparently has been disked. Trees and thickets, some of which may have relatively recently invaded the prairie, have been bulldozed from part of the area, but the wild plums were not destroyed and they are resprouting. Despite these disturbances, 7% of the whole area has prairie of the highest natural quality, and almost all of the area that is not in cultivation has at least some prairie vegetation.

Wilderness character. -- Standing among the plum thickets and tall grasses in the valley and viewing the slopes covered by prairie vegetation, one can imagine how the landscape must have appeared when Illinois was a wilderness.

Replication of existing preserves. -- There are no nature preserves in the Western Forest-Prairie Division. Part of Siloam Springs State Park, in the Galesburg Section, has been considered for dedication as a nature preserve.

Scientific and educational value

A recently-completed Master's thesis on the eastern massasauga at the prairie increases the preservation value of the area, for it provides scientific information on the area and could serve as a benchmark for future studies. Also, the value of the study would be increased if the area is preserved.

The possibilities for other studies of the fauna and flora are great, and the area is suitable for visitation by school groups. Knox College in Galesburg is 15 miles from the prairie and Western Illinois University in Macomb is 25 miles to the south.

Public enjoyment

The seasonal color of the prairie vegetation is scenic: the spectacular masses of white plum blossoms in the spring; the pinks, whites, and yellows of the summer flowers; and the orange-brown of the autumn grasses. Heavy or uncontrolled use of the prairie by the public, however, would cause management prob-

B. Land Condition Classification

Land condition	<u>Acres</u>	<u>Percent</u>
Cropland	49.6	54
Open land with little natural quality (Less than 1% prairie vegetation)	18.3	19
Woodland and stream border (good natural quality)	6.1	7
Plum thickets (good natural quality)	3.0	3
Prairie of low natural quality (1-25% prairie vegetation)	4.7	5
Prairie of fair natural quality (25-50% prairie vegetation)	2.5	3
Prairie of good natural quality (50-75% prairie vegetation)	1.4	2
Prairie of high natural quality (Over 75% prairie vegetation)	6.5	7
Total	92.1	100

Summary

Cropland and open land with little natural quality	67.9	73
Woodland and plum thickets of good natural quality	9.1	10
Prairie of low to fair natural quality	7.2	8
Prairie of good to high natural quality	7.9	9

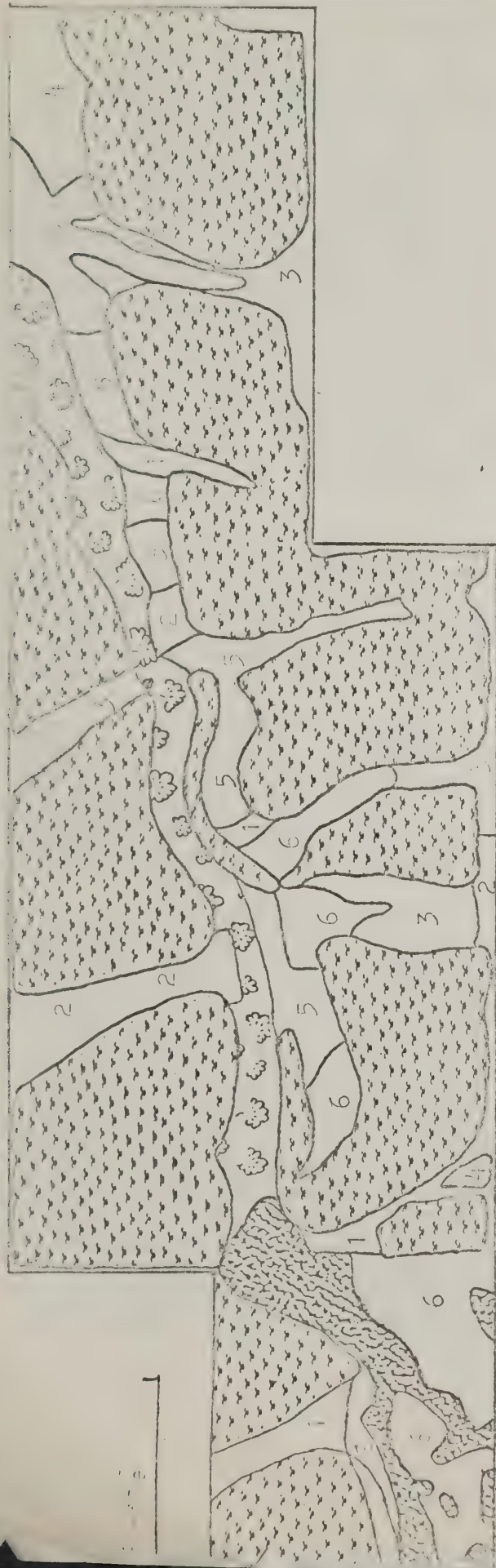


Figure 2. Land Condition Classification

Land condition		Acres	Percent
1. Cropland	.....	49.6	54
2. Woodland and stream border (good natural quality)	.....	6.1	7
3. Plum thickets (good natural quality)	.....	3.0	3
4. Open land with little natural quality (Less than 1% prairie vegetation)	.....	18.3	19
5. Prairie plants inconspicuous	.....	
6. Prairie of low natural quality (1-25% prairie vegetation)	.....	4.7	5
1. Prairie of fair natural quality (25-50% prairie vegetation)	.....	2.3	3
2. Prairie of good natural quality (50-75% prairie vegetation)	.....	1.4	
3. Prairie of high natural quality (Over 75% prairie vegetation)	.....	6.2	7

III. MANAGEMENT

The following discussion of management would apply if the area were a dedicated nature preserve.

Massasauga Prairie might become an attraction to the public as an area of natural prairie, and uncontrolled visitation could cause problems for the visitors and for the prairie. Because of the tall, dense cord grass and blue-joint grass in the wet prairie, rank growths of tall herbs along the stream border, and impenetrable plum thickets in the valley bottoms, visitors would tend to stay in the upland prairie. The upland prairie's soil and vegetation are vulnerable to trampling, and it might be difficult to keep visitors from making their own convenient but damaging paths around wet areas and along the crests of steep slopes. Dedication of a nature preserve might encourage use by people who remove prairie plants and by amateur snake collectors or individuals who would dutifully kill the rattlesnakes.

Use of the area should be governed to provide for the protection of the massasaugas from overzealous collectors and from researchers who are normally intolerant of snakes. Collecting or killing of individuals encountered by users of the area could cause an irreversible decline in the population, which is estimated at from 50 to 75 snakes in all age classes.

Although the massasauga is venomous, it is not aggressive and should be considered as not exceedingly dangerous to man. Proper leather footgear and pants of heavy material such as denim should serve to protect the wearer from any strike. Proper clothing and reasonable caution should enable anyone to carry on research or generally use the area safely.

The area should be managed to insure the survival of the small population of massasaugas, which was the original and main goal of those desiring initially to preserve Massasauga Prairie. It has been shown that the massasaugas in this prairie frequent the plum thickets and are positively associated with small trees such as the plums. The wild plum thickets along the stream should be preserved to safeguard the rattlesnakes, and the wild plums should be allowed to spread up the valleys from which they were bulldozed in 1972. The hillsides are being invaded mostly by smooth sumac and blackberries, and wild plums and gray dogwood are mostly in the low-lying areas. If fire is used to retard the invasion of woody species, the upland slopes could be burned in winter or early spring with probably little or no damage to the colony. In this way, the rolling prairie aspect could be preserved as well as the colony of massasaugas using the wetter areas throughout the small valleys and stream border. Close contact should be maintained between

those managing the area and those familiar with the ecology of the eastern massasauga.

The fact that the natural prairie is mostly a long, narrow strip between cultivated fields would make it necessary to include much cropland for buffer areas. Halting cultivation on the upland would eliminate the current problem of erosion and siltation on the valley slopes. The boundaries of the area total two and one-quarter miles, and almost all of it is well-fenced, except for 15 acres which include the best massasauga habitat, and a strip of cropland bordering the fenced pasture in the southwest end of the acquisition proposal. It would probably be necessary to fence these areas. The most convenient access to the best upland prairie and the plum thickets frequented by massasaugas has been from a road nearly one-half mile north of the area, by walking along a farm lane and the edge of a field. A public road borders the east end of the area, but the road is one-half mile from the best upland prairie and plum thickets. Access could be from cropland along this road, but this would create the problem of having to walk a great distance across wet prairie in the valley bottom or along the edge of fields on the upland to visit the area of greatest interest to most biologists and naturalists. However, the isolation would serve to protect the colony of massasaugas and the prairie vegetation.

IV. CONCLUSION

Plans for future use of the area by the owners are not known, although removal of the plum thickets from the Trummel tract and some bulldozing in the Ray tract indicate that the land might be further improved and more intensively farmed. There is the threat that the prairie might be grazed and cultivated. It is not known whether the owners are interested in preserving or selling the area.

APPENDIX

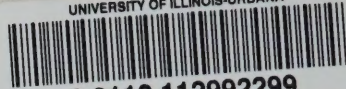
Common and scientific names of plants in text

agrimony	Agrimonia
American elm	Ulmus americana
arrowhead	Sagittaria
arrow-vine	Polygonum sagittatum
aster	Aster
big-toothed sunflower	Helianthus grosseserratus
big bluestem	Andropogon gerardii
black willow	Salix nigra
blackberry	Rubus

blazing stars
 bluejoint grass
 boneset
 bulrush
 bunchflower
 bush-clover
 Canada goldenrod
 cattail
 closed gentian
 compassplant
 cord grass
 corn
 cottonwood
 downy gentian
 flowering spurge
 giant ragweed
 goldenrod
 gray dogwood
 hawthorn
 honey locust
 Indian grass
 Jerusalem artichoke
 Kentucky bluegrass
 leadplant
 little bluestem
 oat
 Osage orange
 pale coneflower
 purple prairie clover
 rattlesnake master
 red clover
 redtop
 rosinweed
 silver maple
 smooth brome
 smooth sumac
 snakeroot
 soybean
 spiderwort
 tall cinquefoil
 tall fescue
 thistle
 tick-clover
 timothy
 Turk's cap lily
 white avens
 wild bergamont
 wild black cherry
 wild indigo
 wild parsnip
 wild plum
 yellow coneflower

Liatris
 Calamagrostis canadensis
 Eupatorium perfoliatum
 Scirpus
 Melanthium virginicum
 Lespedeza
 Solidago canadensis
 Typha latifolia
 Gentiana andrewsii
 Silphium laciniatum
 Spartina pectinata
 Zea mays
 Populus deltoides
 Gentiana puberula
 Euphorbia corollata
 Ambrosia trifida
 Solidago
 Cornus racemosa
 Crataegus
 Gleditsia triacanthos
 Sorghastrum nutans
 Helianthus tuberosus
 Poa pratensis
 Amorpha canescens
 Andropogon scoparius
 Avena sativa
 Maclura pomifera
 Echinacea pallida
 Petalostemum purpureum
 Eryngium yuccifolium
 Trifolium pratense
 Agrostis alba
 Silphium integrifolium
 Acer saccharinum
 Bromus inermis
 Rhus glabra
 Sanicula
 Glycine max
 Tradescantia
 Potentilla arguta
 Festuca elatior
 Cirsium
 Desmodium
 Phleum pratense
 Lilium michiganense
 Geum canadense
 Monarda fistulosa
 Prunus serotina
 Baptisia leucantha
 Pastinaca sativa
 Prunus americana
 Ratibida pinnata

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